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☞ The post-office address of the School of Liberal Arts, Jackson College for Women, the Crane Theological School, the Engineering School, and the Bromfield-Pearson School, is TUFTS COLLEGE, MASS.

The address of the Medical and Dental Schools is 416-430 HUNTINGTON AVENUE, BOSTON, MASS.

Send all communications relative to the Engineering School to the Dean, Professor GARDNER C. ANTHONY.

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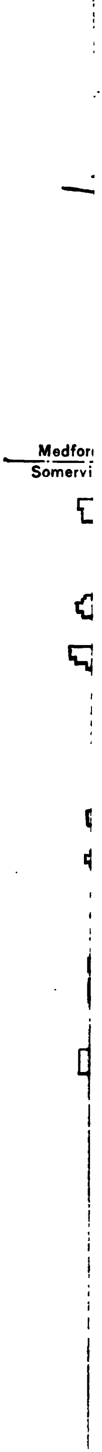
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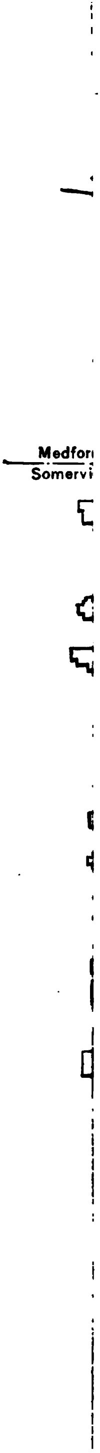
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# ANNOUNCEMENT

OF THE

# ENGINEERING SCHOOL

1914-1915

TUFTS COLLEGE, MASS.
1914

## Calendar — 1914–1915

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### SEPTEMBER

| S | M | T | W | T | F | S |
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### JUNE

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### JULY

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### AUGUST

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Tufts College, about four miles from Boston, is accessible by rail and by electric cars. The railway station, "Tufts College," is on the Southern Division of the Boston and Maine Railroad; but goods sent by freight go to North Somerville, Mass., and should be so addressed. The post-office address is "Tufts College, Mass."

# Calendar

## 1914

### Fall Examinations for Admission to the Department of Arts and Sciences, the Medical School, and the Dental School

Sept. 12. Elementary, Intermediate, and Advanced French, 9 to 11; Elementary, Intermediate, and Advanced German, 11 to 1; Elementary and Advanced Greek, Advanced Algebra and Trigonometry, 2 to 5.

Sept. 14. Algebra, 9 to 10.30; English, 10.30 to 12.30; Plane Geometry, 2 to 4; Physics, 4 to 5; Drawing, 4 to 6.

Sept. 15. Elementary, Intermediate, and Advanced Latin, 9 to 12; Solid Geometry, 9 to 11; Botany, Zoology, Geology and Economics, 11 to 1; History, 2 to 4 Chemistry, 4 to 5.

Sept. 17. College year begins, Thursday morning. Registration.
Oct. 12. Columbus Day, College exercises are suspended.
Oct 18. Russell Lecture, Sunday, 4 P.M.
Nov. 18. Announcement of Academic Honors, 12 M., Wednesday.
Nov. 26. Thanksgiving Day, College exercises are suspended.
Dec. 19. Christmas recess begins, Saturday, 1 P.M.

## 1915

Jan. 3. Christmas recess ends, Sunday evening.
Jan. 29, 30, Feb. 1, 2, 3. Mid-year examinations.
Feb. 3. End of the first half-year, Wednesday.
Feb. 8. Second half-year begins, Monday. Registration.
Feb. 22. Washington's Birthday. College exercises are suspended.
Apr. 14. Spring recess begins, Wednesday evening.
Apr. 21. Spring recess ends, Wednesday evening.
May 7. Goddard Prize Reading, Friday, 8 P.M.
May 27–29. Senior examinations in the Engineering School.
May 30. Memorial Day, Sunday. College exercises are suspended on Monday.
June 1. Senior Theses in Engineering School must be filed at the office of the Dean before 5 P.M.
June 5, 7, 8, 9, 10. Final examinations.
June 11. Class Day, Friday.
June 13. Baccalaureate Sermon, Sunday, 4 P.M.
June 16. Annual Commencement, Wednesday.
June 14–19. Entrance examinations conducted by the College Entrance Examination Board. Application blanks may be obtained from the Secretary of the Board, P. O. Sub-Station 84, New York, N. Y.

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* Numbers following the names indicate date of expiration of term.

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|---|---|
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| CHARLES HIAL DARLING, LL.D. | Burlington, Vt. |
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| FRED STARK PEARSON, D.S., LL.D. | Great Barrington, Mass. |
| ROBERT CALTHROP BROWN, A.B., E.E. | Toronto, Canada |
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# DEPARTMENT OF ARTS AND SCIENCES

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## REQUIREMENTS FOR ADMISSION

AND

## GENERAL INFORMATION

# Standing Committees

## OF THE FACULTY OF ARTS AND SCIENCES *

ADMISSIONS: Dean Wren, *Chairman;* Dean Anthony, Professor Reed.

ABSENCES AND PETITIONS: Dean Wren, *Chairman;* Deans Anthony and McCollester, and Professor Reed.

COMMON INTERESTS: Acting President Hooper, *Chairman;* Deans Wren, Anthony, McCollester, Fay, and Davies.

SCHOLARSHIPS AND AIDS: Acting President Hooper, *Chairman;* Deans Wren, Anthony, and McCollester and Professor Reed.

MEMBERS ON THE PART OF THE FACULTY OF ARTS AND SCIENCES OF THE BOARD OF DIRECTORS OF ATHLETICS: Dean Wren, *Chairman;* Dean Anthony, Dr. Burnett.

STUDENT ORGANIZATIONS: Dean Anthony, *Chairman;* Professors Denison, Rockwell, Seavey, and Gilmer.

STUDENT EMPLOYMENT: Professor Reed, *Chairman;* Professors Gilmer and Carroll.

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* The Faculty of Arts and Sciences consists of the Faculties of the School of Liberal Arts, the Engineering School, the Graduate School, and the Crane Theological School, constituting one body for the discharge of certain administrative functions.

# Requirements for Admission

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Candidates for admission to the Department of Arts and Sciences must have received adequate preparation in certain subjects falling in two groups, known respectively as the Primary and the Secondary Group. A unit represents a year's study in any subject in a secondary school, representing approximately a quarter of a full year's work.

### The Primary Group

English A, 2
English B, 1
*An Elementary Foreign Language, ancient or modern, 2
History, 1
Algebra, 1½
Plane Geometry, 1.

Candidates for admission must present all the subjects of the Primary Group, and a certain part of the subjects of the Secondary Group, depending upon the degree in view. No subject offered in the Primary Group can be counted in the Secondary Group.

### The Secondary Group

#### ELEMENTARY

Greek, 2
Latin, 2
French, 2
German, 2
Chemistry, 1
Physics, 1
Botany, 1
Zoology, 1
Geology or Geography, 1
Mechanical Drawing, 1
Freehand Drawing, 1
Shop Work, ½ to 2
Economics, ½
Musical Appreciation, ½
Music (Harmony), ½

#### INTERMEDIATE †

Latin, 1
French, 1
German, 1

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*Candidates for the degree of Bachelor of Science in the courses in Biology, Physics, and Chemistry should present Elementary German.

Engineering students will find it an advantage to present both French and German.

† The credit for intermediate subjects, as here given, is in addition to the credit for the corresponding elementary subjects.

### ADVANCED *

Greek, 1
Latin, 1
French, 1
German, 1
History
Algebra, ½
Trigonometry, ½
Solid Geometry, ½
Counterpoint, ½
Pianoforte, Voice, or Violin, ½

Candidates for the degree of Bachelor of Arts or Bachelor of Divinity must submit, in addition to the subjects of the Primary Group, a selection of subjects from the Secondary Group aggregating 6½ units, according to the valuation indicated above. Candidates for the degree of Bachelor of Science in the School of Liberal Arts must submit from the Secondary Group subjects aggregating 6½ units, and candidates for the same degree in the Engineering School, subjects aggregating 5½ units.

The following conditions are to be observed:

1. The 6½ units for the course leading to A.B. must include those representing one advanced ancient language.

2. The 5½ units for any course in Engineering must include ½ unit in Solid Geometry.

Detailed information concerning the amount and character of the work demanded in preparation will be found on the following pages.

## Detailed Statement of Requirements

**Elementary English.** *Three units.*

*Requirement for 1914*

Preparation in English has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence, and appreciation.

The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, paragraphs, and the different kinds of whole composition, including letter-writing, should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise narration, description, and easy exposition and argument based upon simple outlines. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge, and studies other than English, as well as from the reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in recitations and in various exercises, whether oral or written.

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*The credit for advanced subjects, as here given, is in addition to the credit for the corresponding elementary and intermediate subjects.

The second object is sought by means of two lists of books, headed respectively *reading* and *study*, from which may be framed a progressive course in literature covering four years. In connection with both lists, the student should be trained in reading aloud and be encouraged to commit to memory some of the more notable passages, both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads, and with their place in literary history.

### READING (A) *Two Units.*

The aim of this course is to foster in the student the habit of intelligent reading, and to develop a taste for good literature, by giving a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least ten units are to be selected, two from each group. Each unit is set off by semicolons.

I. The Old Testament, comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings, and Daniel, together with the books of Ruth and Esther; the Odyssey, with the omission, if desired, of Books I, II, III, IV, V, XV, XVI, XVII; the Iliad, with the omission, if desired, of Books XI, XIII, XIV, XV, XVII, XXI; Virgil's Æneid. The Odyssey, Iliad, and Æneid should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakespeare's Merchant of Venice; Midsummer Night's Dream; As You Like It; Twelfth Night; Henry the Fifth; Julius Cæsar.

III. Defoe's Robinson Crusoe, Part I; Goldsmith's Vicar of Wakefield; either Scott's Ivanhoe, or Scott's Quentin Durward; Hawthorne's House of the Seven Gables; either Dickens' David Copperfield, or Dickens' Tale of Two Cities; Thackeray's Henry Esmond; Mrs. Gaskell's Cranford; George Eliot's Silas Marner; Stevenson's Treasure Island.

IV. Bunyan's Pilgrim's Progress, Part I; The Sir Roger de Coverley Papers in the Spectator; Franklin's Autobiography (condensed); Irving's Sketch Book; Macaulay's Essays on Lord Clive and Warren Hastings; Thackeray's English Humourists; Selections from Lincoln, including at least the two Inaugurals, the Speeches in Independence Hall and at Gettysburg, the Last Public Address, and Letter to Horace Greeley, along with a brief memoir or estimate; Parkman's Oregon Trail; either Thoreau's Walden, or Huxley's Autobiography and selections from Lay Sermons, including the addresses on Improving Natural Knowledge, A Liberal Education, and A Piece of Chalk; Stevenson's Inland Voyage and Travels with a Donkey.

V. Palgrave's Golden Treasury (First Series), Books II and III, with especial attention to Dryden, Collins, Gray, Cowper, and Burns; Gray's Elegy in a Country Churchyard, and Goldsmith's Deserted Village; Coleridge's Ancient Mariner, and

Lowell's Vision of Sir Launfal; Scott's Lady of the Lake; Byron's Childe Harold, Canto IV, and Prisoner of Chillon; Palgrave's Golden Treasury (First Series), Book IV, with especial attention to Wordsworth, Keats, and Shelley; Poe's Raven, Longfellow's Courtship of Miles Standish, and Whittier's Snow Bound; Macaulay's Lays of Ancient Rome, and Arnold's Sohrab and Rustum ; Tennyson's Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur; Browning's Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, Hervé Riel, Pheidippides, My Last Duchess, Up at a Villa — Down in the City.

### STUDY (B*) *One Unit.*

This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, or rhetorical structure, upon the exact meaning of words and phrases, the understanding of allusions, and the study of details (not neglecting formal grammar). For this close reading, a play, a group of poems, an oration, and an essay, are provided, as follows:

Shakespeare's Macbeth; Milton's L'Allegro, Il Penseroso, and Comus; either Burke's Speech on Conciliation with America, or both Washington's Farewell Address and Webster's First Bunker Hill Oration; either Macaulay's Life of Johnson, or Carlyle's Essay on Burns.

**Examination.**

However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling, or other essentials of good usage.

The examination will be divided into two parts, one of which may be taken as a preliminary, and the other as a final.

The first part of the examination will be upon ten units chosen, in accordance with the plan described above, from the lists headed *reading;* and it may include also questions upon grammar and the simpler principles of rhetoric, and a short composition upon some topic drawn from the student's general knowledge or experience. On the books prescribed for reading, the form of the examination will usually be the writing of short paragraphs on several topics which the candidate may choose out of a considerable number. These topics will involve such knowledge and appreciation of plot, character-development, and other qualities of style and treatment as may be fairly expected of high school students. In grammar and rhetoric, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English which one should know in distinction from current errors.

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*The important changes that went into effect with 1913 consisted of a greater emphasis upon formal grammar, rhetorical structure and, in the books under Group B, the study of details.

The second part of the examination will include composition and those books comprised in the list headed *study*. The test in composition will consist of one or more essays, developing a theme through several paragraphs, the subjects to be drawn from the books prescribed for *study*, from the candidate's other studies, and from personal knowledge and experiences quite apart from reading. For this purpose the examiner will provide several subjects, perhaps five or six, from which the candidate may select. The test on the books prescribed for study will consist of questions upon their content, form, and structure, and upon the meaning of such words, phrases, and allusions as may be necessary to an understanding of the works and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

In place of the examinations in Elementary English a candidate may offer the examinations of the College Entrance Examination Board in English A and B.

## *Requirements for 1915–1919*

The study of English in school has two main objects: (1) command of correct and clear English, spoken and written; (2) ability to read with accuracy, intelligence and appreciation.

### Grammar and Composition.

The first object requires instruction in grammar and composition. English grammar should ordinarily be reviewed in the secondary school; and correct spelling and grammatical accuracy should be rigorously exacted in connection with all written work during the four years. The principles of English composition governing punctuation, the use of words, sentences, and paragraphs should be thoroughly mastered; and practice in composition, oral as well as written, should extend throughout the secondary school period. Written exercises may well comprise letter-writing, narration, description, and easy exposition and argument. It is advisable that subjects for this work be taken from the student's personal experience, general knowledge, and studies other than English, as well as from his reading in literature. Finally, special instruction in language and composition should be accompanied by concerted effort of teachers in all branches to cultivate in the student the habit of using good English in his recitations and various exercises, whether oral or written.

### Literature.

The second object is sought by means of two lists of books, headed respectively *Reading* and *Study*, from which may be framed a progressive course in literature covering four years. In connection with both lists, the student should be trained in reading aloud and be encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary appreciation, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

### READING (A) *Two units.*

The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature, by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I:—

Group I. *Classics in Translation.*—The Old Testament, comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings, and Daniel, together with the books of Ruth and Esther; the Odyssey, with the omission, if desired, of Books I, II, III, IV, V, XV, XVI, XVII; the Iliad, with the omission, if desired, of Books XI, XIII, XIV, XV, XVII, XXI; the Aeneid. The Odyssey, Iliad, and Aeneid should be read in English translations of recognized literary excellence.

For any selection from this group a selection from any other group may be substituted,

Group II. *Shakespeare.*—Midsummer Night's Dream; Merchant of Venice; As you Like It; Twelfth Night; The Tempest; Romeo and Juliet; King John; Richard II; Richard III; Henry V; Coriolanus; Julius Cæsar*; Macbeth*; Hamlet*.

Group III. *Prose Fiction.* Malory's Morte d'Arthur (about 100 pages); Bunyan's Pilgrim's Progress, Part I; Swift's Gulliver's Travels (voyages to Lilliput and to Brobdingnag); DeFoe's Robinson Crusoe, Part I; Goldsmith's Vicar of Wakefield; Frances Burney's Evelina; Scott's Novels (any one); Jane Austen's Novels (any one); Maria Edgeworth's Castle Rackrent, or The Absentee; Dickens's Novels (any one); Thackeray's Novels (any one); George Eliot's Novels (any one); Mrs.

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* If not chosen for study under (B).

Gaskell's Cranford; Kingsley's Westward Ho! or Hereward, the Wake; Reade's The Cloister and the Hearth; Blackmore's Lorna Doone; Hughes's Tom Brown's Schooldays; Stevenson's Treasure Island, or Kidnapped, or Master of Ballantrae; Cooper's Novels (any one); Poe's Selected Tales; Hawthorne's The House of the Seven Gables, or Twice-Told Tales, or Mosses from an Old Manse; a collection of Short Stories by various standard writers.

Group IV. *Essays, Biography, etc.*—Addison and Steele's The Sir Roger de Coverley Papers, or Selections from the Tatler and Spectator (about 200 pages); Boswell's Selections from the Life of Johnson (about 200 pages); Franklin's Autobiography; Irving's Sketch Book (about 200 pages), or Life of Goldsmith; Southey's Life of Nelson; Lamb's Essays of Elia (about 100 pages); Lockhart's Life of Scott (about 200 pages); Thackeray's Lectures on Swift, Addison, and Steele in the English Humourists; Macaulay's Lord Clive, Warren Hastings, Milton, Addison, Goldsmith, Frederic the Great, Madame d'Arblay (any one); Trevelyan's Life of Macaulay (about 200 pages); Ruskin's Sesame and Lilies, or Selections (about 150 pages); Dana's Two Years before the Mast; Selections from Lincoln, including at least the two Inaugurals, the Speeches in Independence Hall and at Gettysburg, the Last Public Address, and the Letter to Horace Greeley, together with a brief memoir or estimate; Parkman's The Oregon Trail; Thoreau's Walden; Lowell's Selected Essays (about 150 pages); Holmes's The Autocrat of the Breakfast Table; Stevenson's An Inland Voyage, and Travels with a Donkey; Huxley's Autobiography, and selections from Lay Sermons, including the addresses on Improving Natural Knowledge, A Liberal Education, and A Piece of Chalk; a collection of essays by Bacon, Lamb, DeQuincey, Hazlitt, Emerson, and later writers; a collection of Letters by various standard writers.

Group V. *Poetry*. Palgrave's Golden Treasury (First Series), Books II and III, with special attention to Dryden, Collins, Gray, Cowper, and Burns; Palgrave's Golden Treasury (First

Series), Book IV, with special attention to Wordsworth, Keats, and Shelley (If not chosen for study under B); Goldsmith's The Traveller, and the Deserted Village; Pope's The Rape of the Lock; a collection of English and Scottish Ballads, as, for example, some Robin Hood ballads, The Battle of Otterburn, King Estmere, Young Beichan, Bewick and Grahame, Sir Patrick Spens, and a selection from later ballads; Coleridge's The Ancient Mariner, Christabel, and Kubla Khan; Byron's Childe Harold, Canto III or IV, and The Prisoner of Chillon; Scott's The Lady of the Lake, or Marmion; Macaulay's The Lays of Ancient Rome, The Battle of Naseby, The Armada, Ivry; Tennyson's The Princess, or Gareth and Lynette, Lancelot and Elaine, and The Passing of Arthur; Browning's Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, Hervé Riel, Pheidippides, My Last Duchess, Up at a Villa—Down in the City, The Italian in England, The Patriot, The Pied Piper, "De Gustibus"—, Instans Tyrannus; Arnold's Sohrab and Rustum, and the Forsaken Merman; Selections from American Poetry, with special attention to Poe, Lowell, Longfellow, and Whittier.

STUDY (B) *One unit.*

This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. The books provided for study are arranged in four groups, from each of which one selection is to be made.

Group I. *Drama.*—Shakespeare's Julius Cæsar, Macbeth, Hamlet.

Group II. *Poetry.*—Milton's L'Allegro, Il Penseroso, and either Comus or Lycidas; Tennyson's The Coming of Arthur, The Holy Grail, and The Passing of Arthur; the selections from Wordsworth, Keats, and Shelley in Book IV of Palgrave's Golden Treasury (First Series).

Group III. *Oratory.*—Burke's Speech on Conciliation with America; Macaulay's Two Speeches on Copyright, and Lincoln's Speech at Cooper Union; Washington's Farewell Address, and Webster's First Bunker Hill Oration.

Group IV. *Essays.*—Carlyle's Essay on Burns, with a selection from Burns's Poems; Macaulay's life of Johnson; Emerson's Essay on Manners.

**Examination.**

However accurate in subject-matter, no paper will be considered satisfactory if seriously defective in punctuation, spelling, or other essentials of good usage.

The examination will be divided into two parts, one of which will be on grammar and composition, and the other on literature.

In grammar and composition, the candidate may be asked specific questions upon the practical essentials of these studies, such as the relation of the various parts of a sentence to one another, the construction of individual words in a sentence of reasonable difficulty, and those good usages of modern English, which one should know in distinction from current errors. The main test in composition will consist of one or more essays, developing a theme through several paragraphs; the subjects will be drawn from the books read, from the candidate's other studies, and from his personal knowledge and experience quite apart from reading. For this purpose the examiner will provide several subjects, perhaps eight or ten, from which the candidate may make his own selections. He will not be expected to write more than four hundred words per hour.

The examination in literature will include:—

(*a*) General questions designed to test such a knowledge and appreciation of literature as may be gained by fulfilling the requirements defined under READING (A), above. The candidate will be required to submit a list of the books read in preparation for the examination, certified by the principal of the school in which he was prepared; but this list will not be made the basis of detailed questions.

(*b*) A test on the books prescribed for study, which will consist of questions upon their content, form, and structure, and upon the meaning of such words, phrases, and allusions as may be necessary to an understanding of the works, and an appreciation of their salient qualities of style. General questions may also be asked concerning the lives of the authors, their other works, and the periods of literary history to which they belong.

**Elementary German.** *Two units.*

It is expected that the candidate will have studied the subject in a systematic course for two school years, each covering the equivalent of 120 sixty-minute periods, during which special attention will have been given to pronunciation and to writing from dictation, as well as to the use of clear and idiomatic English in translation.

The examination will consist of two parts: —

(*a*) The translation into German of easy English sentences, to test the candidate's knowledge of the following subjects: the declension of nouns, adjectives, and pronouns; the conjugation of weak and the more frequently recurring strong verbs; the prepositions and cases which they govern; the simpler uses of modal auxiliaries; the elementary rules of syntax and word order. Proficiency may also be tested by questions on these topics.

(*b*) The translation at sight of easy German prose. It is believed that the requisite facility may be acquired by the reading of from two to three hundred pages of easy German, with preference given to narrative style.

[The following list is made up from works suitable for reading in preparation for this examination; Anderson's Bilderbuch ohne Bilder; Arnold's Fritz auf Ferien; Baumbach's Schwiegersohn: Heyse's Hochzeit auf Capri; Storm's Immensee; Leander's Träumereien; Roth's Ein nordischer Held; Benedix, Der Prozess; Wilhelmi's Einer muss heiraten; Fulda's Das verlorene Paradies.]

In place of the examination in Elementary German a candidate may offer the examination of the College Entrance Examination Board in German A.

**Intermediate German.** *One unit.*

It is expected that the candidate will have pursued, in addition to the work done in preparation for Elementary German, an additional year's work of 120 hours. He should thus have acquired the ability to translate with considerable facility ordinary prose, similar to that of the preparatory course, and to answer briefly in German questions asked in that language by the instructor. Oral practice and dictation should be continued in this third year and a somewhat thorough acquaintance obtained with the rules of syntax, particularly with the subjunctive and infinitive moods; attention should also be given to the simpler facts of word formation — roots, prefixes and suffixes.

The examination will consist of two parts: —

(*a*) The translation into German of a connected passage of simple English, paraphrased from some German text.

(*b*) The translation at sight of passages of ordinary German prose. It is believed that the requisite facility may be acquired by reading in addition to the amount stated for Elementary German, about four hundred pages of narrative and dramatic prose and verse.

[The following list is made up from works suitable for reading in preparation for this examination: Ebner-Eschenbach's Freiherren von Gemperlein; Gerstäcker's Irrfahrten; Hoffmann's Historische Erzählungen; Meyer's Gustav Adolfs Page; Riehl's Burg Neideck und Fluch der Schönheit; Freitag's Aus dem Staat Friedrichs des Grossen, and die Journalisten; Schiller's Geisterseher, Neffe als Onkel, and Balladen; Scheffel's Trompeter von Säkkingen.]

In place of the examination in Intermediate German a candidate may offer the examination of the College Entrance Board in German B.

**Advanced German.** *One unit.*

This examination is open to candidates who have had the equivalent of a four years' course, with an average of 120 full hour periods per year. At the end of this course the student should be able to read, after brief inspection, any (save technical) modern German literature. if free from unusual textual difficulties; to put into German a passage of simple English prose, or to write in that language a brief theme on some assigned topic within his range; and to answer in German questions relating to the lives and certain works of the authors studied.

The examination will consist of three parts: —

(*a*) The writing in German of a paragraph, original or translated.

(*b*) The translation into English of extracts from at least three distinctively different authors. It is believed that the requisite facility may be acquired by reading in addition to the amount mentioned under Intermediate German, about five hundred pages of good literature in prose and verse.

(*c*) An oral test of proficiency in hearing and pronouncing German.

[The following list is made up from works suitable for reading in preparation for this examination: Fouqué's Undine; Scheffel's Ekkehard; Ludwig's Zwischen Himmel und Erde; Freytag's Soll und Haben; Hauff's Lichtenstein; Goethe's Dichtung und Wahrheit (extracts), Die neue Melusine, Hermann und Dorothea; Lessing's Minna von Barnhelm, Schiller's Wilhelm Tell, Jungfrau von Orleans, Geschichte des dreissigjährigen Krieges (third book); Grillparzer's Sappho; Kleist's Prinz von Homburg; Fulda's Talisman.]

In place of the examination in Advanced German, a candidate may offer the examination of the College Entrance Examination Board in German BC.

**Elementary French.** *Two units.*

It is expected that the candidate will have studied the subject in a systematic course for two school years, each covering the equivalent of 120 sixty-minute periods, during which special attention will have been given to pronunciation and to writing from dictation, as well as to the use of clear, idiomatic English in translation.

The examination will consist of two parts: —

(*a*) The translation into French of easy English sentences to test the candidate's knowledge of the following subjects: the conjugation of the regular and the most frequently recurring irregular verbs; the forms and positions of personal pronouns; the uses of the other pronouns and of possessive, demonstrative, and interrogative adjectives; the variation of nouns and adjectives for gender and number (except rare cases); the partitive construction. Proficiency may also be tested by questions on these topics.

(*b*) The translation at sight of a passage of easy French. It is believed that the requisite facility may be acquired by the reading of not less than three hundred and fifty pages of simple prose, with preference given to narrative.

[The following list is made up from works suitable for reading in preparation for this examination: The easier stories of Daudet, Verne, and Erckmann-Chatrian; Foa's Le petit Robinson and Contes Biographiques; Enault's Le Chien du Capitaine; Malot's Sans Famille; About's Le Roi des Montagnes; Labiche and Martin's La Poudre aux Yeux and Le Voyage de M. Perrichon; Sarcey's Le Siège de Paris.]

In place of the examination in Elementary French a candidate may offer the examination of the College Entrance Examination Board in French A.

**Intermediate French.** *One unit.*

It is expected that the candidate will have passed, in addition to the work done in preparation for Elementary French, an additional year's work of 120 hours. He should thus have acquired the ability to translate with facility ordinary prose or verse similar to that of the preparatory course, and to answer briefly in French questions asked in that language by the instructor. Oral practice and dictation should therefore be continued in this third year, together with a more detailed study of syntax, particularly of the use of moods and tenses, and of word formation and common idiomatic phrases.

The examination will consist of two parts: —

(*a*) The translation into French of a connected passage of simple English.

(*b*) The translation at sight of passages of ordinary French prose or dramatic verse. It is believed that the requisite facility may be acquired by reading, in addition to the amount required for Elementary French, not less than four hundred pages of prose and verse, preference still being given to narrative form.

[The following list is made up from works suitable for reading in preparation for this examination: About's stories; Daudet's La Belle-Nivernaise; La Brète's Mon Oncle et mon Curé; Loti's Pêcheur d'Islande; George Sand's Les Maîtres Mosaïstes; Mérimée's Colomba; Thierry's Récits des Temps mérovingiens; Thiers's L'Expédition de Bonaparte en Egypte; Vigny's La Canne de Jonc; Corneille's Horace; Molière's L'Avare and Le Bourgeois Gentilhomme; Racine's Athalie; Augier and Sandeau's Le Gendre de M. Poirier; Coppée's poems.]

In place of the examination in Intermediate French a candidate may offer the examination of the College Entrance Examination Board in French B.

**Advanced French.** *One unit.*

This examination is open to candidates who have had the equivalent of a four year's course, with an average of 120 full hour periods per year. At the end of this course the student should be able to read at sight, with the help of a vocabulary of special or technical expressions, difficult French of not earlier than the seventeenth century; to write in French a short essay on some simple subject connected with the works read in preparation, and to take part in a simple conversation in French.

The examination will consist of three parts: —

(*a*) The writing in French of an original passage of at least 150 words on some assigned subject.

(*b*) The translation into English of extracts from at least three distinctly different authors. It is believed that the requisite facility may be acquired by reading, in addition to the amount mentioned under Intermediate French, from six hundred to one thousand pages of standard French, inclusive of works merely commented upon in class.

(*c*) An oral test of proficiency in hearing and pronouncing French.

[The following list is made up from works suitable for reading in preparation for this examination: Taine's Origines de la France contempoaine; Sainte-Beuve's Causeries du Lundi (Holt Ed.); Voltaire's Prose

(Heath Ed.); Balzac's La Recherche de l'Absolu; Dumas' Les trois Mousquetaires (Ginn Ed.); Pelissier's Anthologie des Prosateurs français contemporains (Paris, Delagrave Ed.); Racine's Andromaque, Britannicus, Athalie; Corneille's Cinna and Polyeucte; Molière's Les Précieuses Ridicules; Beaumarchais' Mariage de Figaro; Hugo's Hernani and Ruy Blas.]

In place of the above, a candidate may offer the examination of the College Entrance Examination Board in French BC.

**Elementary Latin.** *Two units.*

The Latin reading shall be not less in amount than Cæsar, Gallic War, I—IV, and should be selected by the schools from Cæsar (Gallic War and Civil War) and Nepos (Lives). Candidates will be examined in translation at sight of passages from the above authors, also in grammar and composition.

In place of the examination for two units in Elementary Latin a candidate may offer the following examination of the College Entrance Examination Board:

New Requirements, 3.

**Intermediate Latin.** *One unit.*

The Latin reading, without the prescription of particular authors and works, shall be not less in amount than Cæsar, Gallic War, I—IV, and Cicero, the orations against Catiline, for the Manilian Law, and for Archias; this reading should be selected from Cæsar (Gallic War and Civil War) and Nepos (Lives), Cicero (orations, letters, and De Senectute) and Sallust (Catiline and Jugurthine War).

Candidates will be examined in translation at sight of passages from Cæsar and Cicero. The vocabulary, constructions, and range of ideas will be suited to the preparation secured by the reading indicated above. There will also be an examination on the following prescribed reading: Cicero, orations for the Manilian Law and for Archias.

Or the requirement in poetry, as defined under Advanced Latin, may be offered as optional in place of the third year prose.

The examinations in grammar and composition will demand thorough knowledge of all regular inflections, all common irregular forms, and the ordinary syntax and vocabulary of the prose authors read in school, with ability to use this knowledge in writing simple Latin prose. The words, constructions, and range of ideas called for in the examination in composition will be such as are common in the reading of the years covered by the examination.

In place of the examination for three units in Intermediate Latin a candidate may offer the following examinations of the College Entrance Examination Board:

New Requirements, 1, 2, and 4.

**Advanced Latin.** *One unit.*

### I. AMOUNT AND RANGE OF THE READING REQUIRED

1. The Latin reading, without regard to the prescription of particular authors and works, shall be not less in amount than Cæsar, Gallic War, I—IV; Cicero, the orations against Catiline, for the Manilian Law, and for Archias; Vergil, Æneid, I—VI.

2. The amount of reading specified above shall be selected by the schools from the following authors and works: Cæsar (Gallic War and Civil War) and Nepos (Lives); Cicero (orations, letters, and De Senectute) and Sallust (Catiline and Jugurthine War); Vergil (Bucolics, Georgics, and Æneid) and Ovid (Metamorphoses, Fasti, and Tristia).

### II. SUBJECTS AND SCOPE OF THE EXAMINATIONS

1. *Translation at sight.* Candidates will be examined in translation at sight of both prose and verse. The vocabulary, constructions, and range of ideas of the passages set will be suited to the preparation secured by the reading indicated above.

2. *Prescribed Reading.* Candidates will be examined also upon the following prescribed reading: Cicero, orations for the Manilian Law and for Archias, and Vergil, Æneid, I, II, and either IV or VI at the option of the candidate, with questions on subject-matter, literary and historical allusions, and prosody. Every paper in which passages from the prescribed reading are set for translation will contain also one or more passages for translation at sight; and candidates must deal satisfactorily

with both these parts of the paper, or they will not be given credit for either part.

3. *Grammar and Composition.* See statement under Intermediate Latin.

In place of the examination for four units in Latin a candidate may offer the following examinations of the College Entrance Examination Board:

New Requirements, 1, 2, 4, and 5.

### SUGGESTIONS CONCERNING PREPARATION

Exercises in translation at sight should begin in school with the first lessons in which Latin sentences of any length occur, and should continue throughout the course with sufficient frequency to insure correct methods of work on the part of the student. From the outset particular attention should be given to developing the ability to take in the meaning of each word —and so, gradually, of the whole sentence—just as it stands; the sentence should be read and understood in the order of the original, with full appreciation of the force of each word as it comes, so far as this can be known or inferred from that which has preceded and from the form and the position of the word itself. The habit of reading in this way should be encouraged and cultivated as the best preparation for all the translating that the student has to do. No translation, however, should be a mechanical metaphrase. Nor should it be a mere loose paraphrase. The full meaning of the passage to be translated, gathered in the way described above, should finally be expressed in clear and natural English.

A written examination cannot test the ear or tongue, but proper instruction in any language will necessarily include the training of both. The school work in Latin, therefore, should include much reading aloud, writing from dictation, and translation from the teacher's reading. Learning suitable passages by heart is also very useful, and should be more practised.

The work in composition should give the student a better understanding of the Latin he is reading at the time, if it is prose, and greater facility in reading. It is desirable, however, that there should be systematic and regular work in composition during the time in which poetry is read as well; for this work the prose authors already studied should be used as models.

**Elementary Greek.** *Two units.*

The examination will be adapted to the proficiency of those who have studied Greek in a systematic course for two years. It will consist of two parts, which cannot be taken separately: —

(*a*) The translation at sight of passages of simple Attic prose.

(*b*) An examination on Xenophon's Anabasis, directed to testing the candidate's mastery of the ordinary forms, constructions, and idioms of the language.

Before taking the elementary examination the candidate should have read, in addition to the usual grammar work, at least four books of Xenophon's Anabasis, or an equivalent.

In place of the examination in Elementary Greek a candidate may offer the following examinations of the College Entrance Examination Board.

Greek A i and ii, B, and G.

**Advanced Greek.** *One unit.*

The examination will be adapted to the proficiency of those who have studied Greek in a systematic course for three years. The two parts of the examination may be taken separately: —

(*a*) The translation at sight of an average passage of Homer; with questions on ordinary forms, constructions, and idioms, and on prosody.

(*b*) The translation into Attic prose of a passage of connected English narrative. The passage set for translation will be based on some portion of the Greek prose works usually read in preparation for college.

Before taking the examination in Advanced Greek the candidate should have completed at least four books of Xenophon's Anabasis, or their equivalent in Attic prose, and six books of Homer's Iliad, or their equivalent in the Odyssey. It is recommended that Greek composition accompany all stages of the preparation, and that the pupil be practiced in reading Greek aloud from the beginning of the course.

In place of the examination in Advanced Greek a candidate may offer the following examinations of the College Entrance Examination Board.

Greek A i, B, C or CH, F, and G.

**Elementary History.** *One unit.*

One of the following: —

1. The History of Greece and Rome. (*a*) The history of Greece to the death of Alexander, with due reference to Greek life, literature, and art, as treated in the histories of Botsford, Oman, West, or Myers. (*b*) The history of Rome to the accession of Commodus, with due reference to Roman literature and government. Such texts as those of Morey, Botsford, West, or Allen will indicate the character of the work desired.

*While the periods indicated above will be accepted as satisfying the entrance requirements in ancient history, it is strongly recommended that the study of the history of Greece be continued to the conquest of Greece by Rome, and that the history of Rome be pursued to the fall of the Western Empire.*

*This does not necessarily imply any increase in the time devoted to Greek and Roman history.*

2. The History of England. The history of England, with due reference to social and political development. The histories of Andrews, Larned, and Montgomery will indicate the character of the work expected.

3. The History and Government of the United States. Such texts as those of McLaughlin, Johnston, Channing, and Guitteau should be used.

*It is recommended that all candidates for admission to the courses leading to the degree of A.B. or B.D. should offer Greek and Roman history.*

The elementary requirement in history implies one year's work of not less than five periods a week. A note-book of not less than fifty written pages, based upon three hundred pages of collateral reading, must be presented at the time of examination. Equivalents for the subjects named above will be accepted, but candidates desiring to offer substitutes must give notice to the Secretary of the Faculty at least one month previous to the time set for the examination. Work in the text-book should be constantly accompanied by collateral reading. The attention of teachers is called to the Report of the Committee of Seven, published by the MacMillan Company, New York, under the title, "The Study of History in Schools," and to the "History Syllabus for Secondary Schools" published by Heath and Co., Boston.

In place of any one of the examinations described above a candidate may offer any one of the four examinations in History of the College Entrance Examination Board.

**Advanced History.**

One of the following: —

1. The History of Greece and Rome, as described above, for those only who have offered English history or the history and government of the United States as primary subjects.

2. The History of England as described above, for those who have not offered English history as a primary subject.

3. The History and Government of the United States, for those who have not offered the History and Government of the United States as a primary subject.

Each of these subjects requires one year's study of not less than five recitation-periods a week. A note-book of not less than fifty written pages, based upon three hundred pages of collateral reading, must be presented at the time of the examination. Equivalents for the subjects outlined above will be accepted, upon due notice, as indicated above under Elementary History.

In place of any of the examinations in Advanced History a candidate may offer any one of the four examinations in History of the College Entrance Examination Board, provided that the subject so offered has not been accepted for the Elementary History requirement.

**Mathematics.**

A knowledge of the metric system, and ability to perform accurately the ordinary processes of arithmetic, are presumed.

1. Algebra, through quadratic equations in one and two unknown quantities, problems depending on quadratic equations, the progressions, ratio and proportion, and the binomial theorem for positive integral exponents. *One and one-half units.*

2. Plane Geometry, including the usual theorems on straight lines, angles, rectilinear figures, circles, and regular polygons; similar triangles and proportion; construction; original exercises in demonstration; numerical problems in mensuration. *One unit.*

3. Advanced Algebra: Permutations and combinations; complex numbers and the graphical representation of sums and differences; determinants including the use of minors, and the solution of linear simultaneous equations; solution of numerical equations of higher degree and so much of the theory of equations, with graphical methods, as is necessary for their treatment, including Descartes' rule of signs and Horner's method. Credit in Advanced Algebra is given only on examination. *One-half unit.*

4. Solid Geometry, including properties of straight lines and planes, dihedral and polyhedral angles; of projections, of polyhedrons, including prisms, pyramids, and the regular solids; of cylinders, cones, and spheres; of spherical triangles, and the measurement of surfaces and solids. *One-half unit.*

5. Plane Trigonometry, including the definition and relations of the six trigonometrical functions as ratios, proof of important formulæ, solution of trigonometric equations of a simple character, theory of logarithms and use of tables, solution of right and oblique plane triangles. *One-half unit.*

In the last three subjects, the school should insist upon the same amount of work and aim at the same standard of scholarship as the college requires in its courses in these subjects.

In place of the examinations in Mathematics a candidate may offer the examinations of the College Entrance Examination Board as follows:

Math. A for 1; Math. C for 2; Math. B for 3; Math. D for 4; Math. F for 5.

**Physics.** *One unit.*

The unit in Physics consists of at least 120 periods of sixty minutes each. Time spent in the laboratory shall be counted at one-half its face value. The course of instruction should include: (1) The study of one standard text-book. (2) Individual laboratory work consisting of experiments requiring at least the time of 30 double periods. Each student should perform at least 30 experiments, so distributed as to cover as fully as possible the subject matter of the text-book.

In lieu of the presentation of the laboratory note-book, at the time of the examination, the candidate must present a certificate in the following form:

TEACHER'S CERTIFICATE

.............................. School

................ 19

I certify that ...................................... has personally performed and properly recorded in a suitable note-book .............. experiments in the physical laboratory of the .......................... School, during the year ........

The entire course has occupied time equal to ........periods of 60 minutes each, of which ........ hours have been given to the laboratory work and ........ hours to lecture and recitation work.

Signed ..................................

Teacher of Physics.

The teacher may here enter the final grade of ... .... per cent.

In place of the above, candidates may present the examination of the College Entrance Examination Board in Physics.

**Chemistry.** *One unit.*

Preparation for this requirement presupposes a course in general inorganic chemistry (non-metals and metals) of not less than five periods a week for a year. The amount of class work should equal that in An Introduction to the Study of Chemistry, by Ira Remsen, and the experiments should be equivalent to those in Remsen's Laboratory Manual. Time spent in the laboratory shall be counted at one-half its face value. The experiments must be performed by the student, and a certified laboratory note-book must be presented at the time of the examination.

In place of the above, candidates may offer the examination of the College Entrance Examination Board in Chemistry.

**Botany and Zoology.** *One unit each.*

In Botany and Zoology the examiners give more weight to the character of the work than to time spent; but at least five periods a week for a year must be given to each subject presented, and of this at least a half should consist of laboratory work. Certified copies of laboratory note-books must be presented. The work should be in structural and physiological lines and should include a detailed study of at least ten types.

In place of the examinations in Botany and Zoology, candidates may offer the examinations in Botany and Zoology of the College Entrance Examination Board.

**Geology or Geography.** *One unit.*

1. Geology: Le Conte's Elements of Geology or a book of equivalent grade, including a similar account of evolutionary theory.

2. Geography: Davis, or book of equivalent grade.

At least five periods a week for a year must have been given to the subject presented. There should have been some laboratory work and excursions. Certified copies of note-books of laboratory work and excursions must be presented.

In place of the examination in Geography, candidates may offer the examination in Geography of the College Entrance Examination Board.

**Freehand Drawing.*** *One unit.*

Such a knowledge of the fundamental principles of perspective is required as shall enable the student to draw a simple geometric figure with or without the use of a model. Certified drawings from a systematic course must be submitted for approval and the student may be examined on all points in doubt.

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*Not more than two units may be counted by any candidate in the subjects of Drawing and Shopwork.

In place of the above the candidate may offer the examination in drawing of the College Entrance Examination Board.

**Mechanical Drawing.*** *One unit.*

Accuracy and neatness in drawing is of the first importance, and no amount of work will make amends for neglect in these respects. The student must be familiar with the use of ordinary instruments, and able to solve geometrical problems with accuracy and rapidity. He must have an elementary knowledge of projection, intersection and development, and should also be practiced in the drawing of the ellipse, the parabola, and the hyperbola. The suggested course is included in the first one hundred pages of Anthony's Elements of Mechanical Drawing. Certified drawings must be submitted for approval and the student may be examined on all points in doubt.

**Shopwork.***

The following units are given for courses satisfactorily pursued in well organized and fully equipped manual training or technical high schools in which the broad foundations of manual and graphic culture are given. The elementary work in the several courses must be thoroughly covered, and no credit will be given for premature engineering work.

| | |
|---|---|
| Joinery | *One-half unit* |
| Wood Turning and Elementary Pattern Making | *One-half unit* |
| Forging | *One-half unit* |
| Bench and Machine Metal Fitting | *One-half unit* |

Details of the work required for preparation in the above courses may be obtained by application to the Department of Mechanic Arts.

**Elementary Economics.** *One-half unit.*

Preparation for Economics presupposes that the candidate has studied the subject in a systematic course of at least three periods a week for one full year. Credit in Economics will be given only on examination. The examination will be based upon such text-books as Bullock's or Seager's Introduction to the Study of Economics. A knowledge of civics and, particularly, modern industrial history is of great value in supplementing the study of economic theory.

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* See foot-note on preceding page.

**Music.**

Entrance credit in Music is given only on examination. Not more than one unit in Music may be counted by any candidate.

(A) MUSICAL APPRECIATION. *One-half unit.*

The examination will be adapted to the attainment of those who have had one year's systematic training, with three lessons a week, or its equivalent. The candidate is expected to have (1) a general knowledge of the principal musical forms—song, classic dance, fugue, sonata (all movements), symphony—and of their historical development; (2) a general knowledge of the lives and environment of at least ten composers, including Bach, Mozart, Beethoven, Schubert, Chopin, and five of the following: Purcell, Handel, Gluck, Haydn, Cherubini, Weber, Rossini, Glinka, Mendelssohn, Schumann, Wagner, Verdi; (3) familiarity with certain designated works, the list of which may be had on application to the Department of Music. In the examination on these works, the candidate will be expected to identify characteristic portions of the works set, when played in any key by the examiner; and to give intelligent information concerning the form and character of the works themselves. The test will not require ability to perform, nor to read from printed music.

(B) HARMONY. *One-half unit.*

The examination will be adapted to the proficiency of those who have had one year's systematic training, with three lessons a week, or its equivalent. The candidate should have acquired (1) the ability to harmonize, in four vocal parts, simple melodies of not fewer than eight measures, in soprano or in bass: these melodies will require a knowledge of triads and inversions, of diatonic seventh chords and inversions, in the major and minor modes; and of modulation, transient or complete, to nearly-related keys; (2) analytical knowledge of ninth chords, all non-harmonic tones, and altered chords (including augmented chords). [Students are encouraged to apply this knowledge in their harmonization.]

It is urgently recommended that systematic ear-training (as to interval, melody, and chord) be a part of the preparation for this examination. Simple exercises in harmonization at the pianoforte are recommended. The student will be expected to have a full knowledge of the rudiments of music, scales, intervals, and staff-notation, including the terms and expression-marks in common use.

(D) PIANOFORTE, OR (E) VOICE, OR (F) VIOLIN. *One-half unit.*

The examination in each of these subjects will consist of a test in theory, and a test in performance. The former will be conducted in writing, and will be adapted to the proficiency of those who have had one year's systematic training, with one lesson a week, or its equivalent. The candidate should have acquired:

A knowledge of the rudiments of music, scales, intervals, and staff-notation, including the terms and expression-marks in common use; the ability to analyze the harmony and form of hymn-tunes and simplest pieces for the pianoforte, involving triads and the dominant seventh chord and their inversions, passing tones, and modulation to nearly-related keys; the ability to harmonize, on paper, in four vocal parts, melodic fragments involving the use of triads and the dominant seventh chord and their inversions in major keys.

As a basis of the test in performance, the candidate is to furnish a detailed statement from the teacher, showing the course of instrumental or vocal study pursued.

In place of the above, candidates may offer the corresponding examination of the College Entrance Examination Board: Music A, B, and D or E or F.

## METHODS OF ADMISSION

Admission to Tufts College may be obtained by examination, by certificate, or by a combination of the two methods. Every candidate for admission must present a testimonial of good character from the Principal under whom he was prepared for college.

### Admission by Examination

In June, 1914, the admission examinations of this College will be the examinations of the College Entrance Examination Board, of which Tufts College is a member. The examinations will be held during the week June 15–20, 1914.

All applications for examinations must be addressed to the Secretary of the College Entrance Examination Board, Post Office Sub-Station 84, New York, N. Y., and must be made upon a blank form, to be obtained from the Secretary of the Board upon application.

Applications for examination at points in the United States east of the Mississippi River, also at Minneapolis, St. Louis, and other points on the Mississippi River, must be received by the Secretary of the Board at least two weeks in advance of the examinations, that is, on or before Monday, June 1, 1914; applications for examination elsewhere in the United States or in Canada must be received at least three weeks in advance of the examinations, that is, on or before Monday, May 25, 1914; and applications for examination outside of the United States and Canada must be received at least five weeks in advance of the examinations, that is, on or before Monday, May 11, 1914.

Applications received later than the dates named will be accepted when it is possible to arrange for the admission of the candidates concerned, but only upon the payment of $5.00 in addition to the usual fee.

The examination fee is $5.00 for all candidates examined at points in the United States and Canada, and $15.00 for all candidates examined outside of the United States and Canada. The fee (which cannot be accepted in advance of the application) should be remitted by postal order, express order, or draft on New York to the order of the College Entrance Examination Board.

A list of the places at which examinations are to be held by the Board in June, is published about March 1. Requests that the examinations be held at particular points, to receive proper consideration, should be transmitted to the Secretary of the Board not later than February 1.

For the convenience of those who present the examinations of the College Entrance Examination Board, the following table of equivalents is presented:

| TUFTS COLLEGE ENTRANCE SUBJECTS | COLLEGE ENTRANCE EXAMINATION BOARD EQUIVALENT |
|---|---|
| English A | English A |
| English B | English B |
| Elementary German | German A |
| Intermediate German | German B |
| Advanced German | German BC |
| Elementary French | French A |
| Intermediate French | French B |
| Advanced French | French BC |
| Elementary Latin | Latin 1 and B, or 3 |
| Intermediate Latin | Latin 1, B and C, or 1, 2 and 4 |
| Advanced Latin | Latin 1, B, C, D, P and Q, or 1, 2, 4 and 5 |
| Elementary Greek | Greek A i and ii, B, and G |
| Advanced Greek | Greek A i, B, C or CH, F, and G |
| Elementary History | History, A, B, C, or D |
| Advanced History | History, A, B, C, or D |
| Mathematics | |
| Algebra | Mathematics A |
| Plane Geometry | Mathematics C |
| Advanced Algebra | Mathematics B |
| Solid Geometry | Mathematics D |
| Trigonometry | Mathematics F |
| Physics | Physics |
| Chemistry | Chemistry |
| Botany | Botany |
| Zoology | Zoology |
| Geology or Geography | Geography |
| Freehand Drawing | Drawing |
| Music, A, B, D, E, F | Music, A, B, D, E, F |

Entrance examinations will be conducted at Tufts College in September. These examinations are held on the Saturday, Monday, and Tuesday preceding the beginning of the college year in accordance with the program printed in the calendar, page 4.

All candidates for examination in September are required to register at the office of the Registrar before taking their examinations. A fee of $5.00 is charged all candidates for the September examinations. Those who subsequently enter the Department of Arts and Sciences will not be required to pay the registration fee.

At the regular examination those who will be candidates for admission to the Freshman class one year later may present themselves for examination in the subjects of the Required Group, and in others in which their teachers may certify that they are adequately prepared.

### Admission by Certificate

In place of examinations, certificates will be accepted from preparatory schools which have been approved by the New England College Entrance Certificate Board. All schools in New England which desire the certificate privilege should apply to the Secretary of the Board, Professor Frank W. Nicolson, Wesleyan University, Middletown, Conn., before April 1 of the year for which the certificate privilege is desired.

Applications for the certificate privilege for schools outside of New England should be made by the Principal on a blank provided for the purpose by the Registrar of the College. Applications should be received before April 1, in order that the school may be placed upon the approved list for the next academic year.

The academic diploma of the Regents of the State of New York will be accepted in satisfaction of the requirements for admission when such diploma covers the subjects required for entrance.

Credit in the following subjects, which are outside the ordinary preparatory school curriculum, is allowed only upon examination: Advanced Algebra, Economics, and Music.

Certificates showing that candidates have fulfilled the entrance requirements of another college or university in subjects required for admission to Tufts College will ordinarily be accepted for corresponding subjects.

Certificates should be in the hands of the Registrar of the College at least one month before the opening of the college year. Blank forms of certificates will be sent upon request to the Registrar, Tufts College, Massachusetts.

# General Information

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### REGISTRATION

Every student is required to file at the office of the Registrar a plan of study for the term, on the opening day of the term.

The registration is made in triplicate on blanks furnished for the purpose, one copy to be kept on file by the Registrar, one by the Dean, the third to be used, in case of Freshmen, by advisers, and in case of special students and members of the upper classes, by major instructors. Each student also furnishes such data as are required by the Registrar for class lists. Registration is made for the first half-year in accordance with the following schedules: —

I. FOR STUDENTS IN THE SCHOOL OF LIBERAL ARTS, THE CRANE THEOLOGICAL SCHOOL, AND THE GRADUATE SCHOOL:

8.30–9 A.M. — All students registering for the first time as candidates for A.B. or B.S., or as special students, will pay the registration fee of five dollars at the Bursar's office, unless they have already paid an examination fee to the College.

9–11 A.M. — All students obtain blanks and file programs at the Registrar's office. Members of the three upper classes register in accordance with programs prepared at conference with major instructors held previous to June first.

9.15 A.M.—All students registering for the first time assemble in Room 4, Ballou Hall, for instruction concerning registration, and assignment to advisers.

Regular program appointments are in force on Friday.

II. FOR STUDENTS IN THE ENGINEERING SCHOOL:

9.30–10.30 A.M.—All students registering for the first time will pay the registration fee of five dollars at the Bursar's office, unless they have already paid an examination fee to the College.

10–12 A.M.—All students in this School obtain blanks and file programs at the Registrar's office.

Members of the three upper classes register in accordance with programs prepared at conferences during the June examination period.

11 A.M. — All Freshmen assemble in the chapel for instructions concerning registration, and information regarding courses.

Regular program appointments are in force on Friday.

Consultations concerning programs for the second half-year are held by appointments with advisers and major instructors previous to registration day. On the first day of the second term, between 9 and 11 o'clock, students file their individual programs. Recitations begin in accordance with the regular program on Tuesday, the second day of the term.

A registration fine of two dollars is imposed upon students who fail to register in person during the time prescribed above. This rule does not apply to students registering for the first time. Students are not recognized as members of classes until they have met all requirements of registration.

During the hours set apart for registration, instructors may be seen for consultation and for approval of plans of study, in rooms to be announced by posted bulletins.

## PROGRAM LIMITATION

Plans of study are subject to the following regulations:

### I. FOR STUDENTS IN THE SCHOOL OF LIBERAL ARTS AND THE CRANE THEOLOGICAL SCHOOL:

No Freshman shall take a program of more than sixteen term hours for the first half-year; nor shall a program of more than fifteen term hours be taken by any student who has received for the preceding half-year grade L in subjects aggregating three term hours, or grade C in subjects aggregating more than six term hours; except that each student is permitted to take a program of eighteen hours in his Junior year, with the consent of his major instructor. But a student who has failed in a subject may repeat that subject, provided his program is not thereby increased to more than eighteen term hours.

A program in excess of eighteen term hours shall not be allowed except by special permission of the Faculty.

Physical Education is disregarded in the consideration of program limitation.

### II. FOR STUDENTS IN THE ENGINEERING SCHOOL:

The Freshman program is prescribed. Permission to vary the Freshman program, to take a program in excess of eighteen term hours, or to take a subject out of course, must be obtained by petition to the Committee on Promotions.

## PROGRAM

Any instructor is permitted, after the second full week of a term, to transfer a subject to another program hour, under the following conditions: (a) all students taking the subject must have the new hour free; (b) previous notice must be given to the Committee on Program; (c) the change, if finally made, must be reported at the College Office.

If such a change can be made in two consecutive years, the subject may be permanently transferred to the new hour.

## CHANGES IN REQUIREMENTS

It is the policy of the Faculty not to introduce changes in requirements without due notice in the catalogue, and not to impose additional requirements upon classes already in college. Immediate changes in the curriculum and in the program may occasionally be necessary, and under such circumstances the Faculty reserves the right to make equitable adjustment for students already in college.

## PROMOTIONS

All candidates for degrees are classified as Freshmen until they have removed all entrance conditions.

Candidates for the degree of Bachelor of Arts or Bachelor of Science in the School of Liberal Arts must have received, for promotion to the Sophomore class, a credit of not less than twenty-four term hours, and for promotion to the Junior class a credit of not less than fifty-seven term hours. To become a member of the

Senior class, a student must have completed all the prescribed work, and have credit for not less than eighty-seven term hours.

Candidates for the degree of Bachelor of Science in the Engineering School must have received, for promotion to the Sophomore class, a credit of not less than twenty-nine term hours; for promotion to the Junior class a credit of not less than sixty-four term hours; and for promotion to the Senior class a credit of not less than ninety-nine term hours.

## GRADES OF SCHOLARSHIP

A student's rank is officially recorded by letters, as follows: **A,** excellent; **B,** good; **C,** fair; **L,** passed with low standing; **F,** work incomplete or unsatisfactory; **FF,** complete failure.

The mark **F** imposes a condition which must be removed at a date to be determined by the Committee on Promotions, on consultation with the instructor. In case a mark of **F** is not removed at the date thus determined, the entry will be changed to **FF.** The student must then discontinue any dependent subjects which he is taking, and can obtain a clear record only by repeating the subject in which **F** was given. The responsibility for the removal of the condition rests with the student, who is required to make the necessary arrangement with the instructor and to present at the office a statement from the instructor that the work has been accomplished.

Reports of the work of Freshmen are sent to parents after the first term. Reports for the year are sent in July to all.

## MAJOR SUBJECTS

Every candidate for the degree of Bachelor of Arts or Bachelor of Science in the School of Liberal Arts shall choose a major subject before May fifteenth of the Freshman year.

A change of major subject may be made not later than the end of the Junior year, by vote of the Committee on Promotions on petition approved by the two major instructors concerned.

A second major subject may be granted not later than the end of the Junior year, under the same conditions.

## HONORS

FINAL HONORS IN THE SCHOOL OF LIBERAL ARTS will be conferred at Commencement upon any member of the graduating class who shall have attained Grade A in approved subjects aggregating not less than eighteen term hours in a major department, and an average of Grade B in the collateral subjects. Subjects marked in the catalogue with an asterisk (*) will not count for Honors. Those marked with a double asterisk (* *) will be counted for Honors only when special requirements, to be defined by the instructors, have been complied with. Final Honors will be conferred only upon recommendation of the head of the department in which Honors are desired.

HONORABLE MENTION IN THE SCHOOL OF LIBERAL ARTS will be made, at Commencement, of any student who has attained, during the two years immediately preceding graduation, Grade A in nine term hours and not less than Grade B in three additional term hours of approved work in one department. Subjects marked in the Catalogue with an asterisk (*) or with a double asterisk (* *) are under the conditions explained above as applying to Final Honors.

Candidates for Honorable Mention are expected to report to the Office on or before May 1 the department or departments in which they look for such distinction.

FINAL HONORS IN THE ENGINEERING SCHOOL will be conferred at Commencement upon any member of the graduating class who shall have attained credits in his major department aggregating not less than eighteen term hours of Grade A and nine term hours of Grade B.

HONORABLE MENTION IN THE ENGINEERING SCHOOL will be made at Commencement of any student who has attained in any major department during the two years immediately preceding graduation, Grade A in nine term hours and not less than Grade B in six term hours.

The subjects open for Honors and Honorable Mention in the five major departments in the Engineering School are as follows:

45-1, 45-2, and 45-12 Applied Mechanics may be counted in any department; also, in the Civil Engineering department, all subjects in Civil Engineering (41) except 41-3 Surveying; in the Structural Engineering department, all subjects in Applied Mechanics (45) and Structural Engineering (47); in the Mechanical Engineering department, all subjects in Mechanical Engineering (51); in the Electrical Engineering department, all subjects in Electrical Engineering (61); and in the Chemical Engineering department, all subjects in Chemistry (35) except 35-1 General Chemistry.

## ADMISSION FROM OTHER COLLEGES

Students who have pursued study in any other college of equal rank, and have been honorably dismissed therefrom, are admitted to Tufts College as unclassified students. They will not be assigned to a definite class until such time as the quality of their work in Tufts College shall have given a basis for rating. Such students must present satisfactory certificates showing the amount and character of work already accomplished, in order to obtain credit on a course of this College.

## SPECIAL STUDENTS

Students who are not candidates for a degree, and who wish to pursue a special course of studies, in one or at the most two departments, will be admitted to the College, subject to the following regulations: —

1. Every Special Student shall choose a major department, and shall make up a plan of study under the direction and subject to the approval of the major instructor. If subjects are taken in two departments, they shall be allied.
2. The student shall satisfy the instructor in each subject included in the approved plan of study that he is able to pursue the work.
3. First-year Special Students are limited to sixteen program hours, and thereafter the same rules apply to them as to regular students.
4. A Special Student, on leaving College, shall be entitled to a certificate giving the grade attained in each subject pursued, and signed by the President and the Registrar.

## TERMS AND VACATIONS

Commencement occurs on the third Wednesday in June, and the college year begins on the Thursday following the third Wednesday in September. The year is divided into two terms. College exercises are suspended on certain dates in accordance with the program published at the beginning of the catalogue. An examination period of five days is held at the close of each half-year, during which time the daily class exercises are suspended.

Students are required to report in person at the Registrar's office within two hours after their last program appointment preceding each vacation of more than a single day, except at the mid-year period; and within two hours before their first program appointment following such vacation.

A fine of two dollars will be imposed on each student who shall fail to report as above provided. The regularly appointed registration of studies at the beginning of each term shall be construed as reporting in person.

## ABSENCES

Students are required to notify the Registrar at the beginning of an absence from any cause involving more than three consecutive program appointments. This report may be made in advance, and should state the cause of absence and its probable duration. A similar report is to be made before entering upon college work after the absence.

These reports are for the information of the college authorities, and do not excuse the student from chapel attendance, nor from his obligations to the various instructors.

For the first failure to make such a report a fine of fifty cents shall be levied, and for each subsequent failure a fine of two dollars. In case of the absence of any student organization, notice may be given for all by one authorized representative.

No student organization shall be allowed to make engagements involving absence from college exercises unless such engagements are approved by the appropriate committee of the Faculty.

A report filed in accordance with these regulations shall not take the place of the required registration before and after vacations of more than a single day.

**Absence from Examinations.**—Students absent from examinations and requiring special examinations to make up for such absence are charged two dollars for each special examination.

## OFFICE HOURS

The President may be found in his office in the morning from 8.45 to 9.45. The Dean of the School of Liberal Arts is in his office in Ballou Hall, and the Dean of Jackson College in her office in Miner Hall, throughout the forenoon, except for class engagements. The Dean of the Engineering School may be consulted at his office in the Bromfield-Pearson Building, between 11.00 and 1.00, and at other times by special appointments. The office of the Registrar is open every morning, from 8.45 to 1.00, and every afternoon except Saturday, from 2.00 to 5.00. The Bursar will be in his office in Ballou Hall during term time, Monday, Wednesday, and Friday mornings, from 8.30 to 12.00 o'clock, and on Tuesday and Thursday afternoons from 2.30 to 5.00.

## RELIGIOUS OBSERVANCES

Goddard Chapel, erected in 1882–83, is the gift of Mrs. Mary T. Goddard, as a memorial of her husband, the late Thomas A. Goddard. Attendance upon morning prayers is required.

The RUSSELL LECTURE, established in accordance with a bequest of the late James Russell of Arlington, is delivered before the Trustees, Faculty, and students, by either a clergyman or a layman, on a subject prescribed by the testator.

Two subjects are presented, in alternate years.

The subject for 1913 was "*The Sufficiency of the Promises of the Gospel to meet the Reasonable Wants of Man both in Time and in Eternity.*"

The subject for 1914 is "*The Importance of Christian Faith and Belief in the Formation of the Character of the Good Citizen and the Good Man.*"

## TUFTS COLLEGE STUDIES

A publication called "Tufts College Studies" has been established, as a means of presenting to the world the results of original work done in the different departments of the College. The numbers, which are issued as material is ready, are distributed to educational institutions and learned societies. The College desires to establish regular exchanges of these Studies with publishing institutions at home and abroad. Correspondence regarding exchanges should be addressed to the Librarian of Tufts College. Three volumes of the scientific series have been issued, and a single number of the English series. The editorial board of TUFTS COLLEGE STUDIES for the current year is made up of the President of the College and Professors Fay, Neal, Metcalf, and Rockwell.

## ATHLETICS

The supervision of all athletic sports is vested in a Board of Directors of Athletics, consisting of nine members, three of whom are appointed from the Faculty, three from the Alumni, and three elected from the undergraduates. This board through its sub-committees controls the expenditure of all moneys, the hiring of coaches, the arranging of games, the eligibility of players, and generally seeks to raise all college sports to a level of genuine usefulness. The Director of the Gymnasium limits the candidates for college teams to those students who have shown by a physical examination that they are qualified to engage in strenuous exercise.

## EXPENSES

The charge for instruction in the School of Liberal Arts is *one hundred twenty-five dollars* a year, or *five hundred dollars* for the full course whether it be completed in three, four, or more years. A registration fee of five dollars is charged to all students entering the School of Liberal Arts or the Engineering School.

The tuition fee for every student who entered the Engineering School in 1911–1912 or earlier is *one hundred and fifty dollars* a year, or *six hundred dollars* for the course. For students entering for the first time in 1912–1913 or thereafter the tuition fee is *one hundred and seventy-five dollars* a year, or *seven hundred dollars* for the course.

In the case of students admitted to advanced standing, the fees will be based upon the amount of work done under the direction of Tufts College.

No part of the fees and charges for a term is returnable to the student if he leaves during the term.

Students in the chemical laboratories are charged for breakage, and not more than *four dollars* a term for chemicals used, according to the subjects taken. A fee of *four dollars and a half* a term is required for each laboratory course in the Department of Biology, and a fee of *four dollars* a term for each laboratory course in the Departments of Geology and Mineralogy.

Half room-rent, including heat, ranges from twenty-five to eighty dollars, in the several dormitories. Students furnish their own rooms. Any special damage done by students to college property is charged in the term bills. All damage to dormitories other than normal wear is charged to the occupants. Rooms in the college halls will be open for occupancy of students on and after the Wednesday of the week preceding the opening of the college year, and will be closed on the Wednesday after Commencement. Non-resident students in all departments, except the Medical and Dental Schools, are subject to a fixed annual charge of ten dollars.

Students may obtain the use of day-rooms in the dormitories by arrangement with the Bursar, on payment of a moderate fee.

Payment of tuition, room rent, and other charges in all departments of the College is made in advance for each half-year, on or before November first and March first, but a payment of fifty dollars on the bills due November first will be required of all students on or before October first.

All college charges are payable to the Bursar, and all arrangements with regard to rooms are to be made with him. The Bursar must certify that all college charges have been paid before a student can receive his degree or a letter of honorable dismissal.

The Executive Committee of the Trustees has power to order the suspension or dismissal of a student for failure to keep his bills promptly paid, or for other good and sufficient cause.

Resident students will be given free hospital treatment at the Somerville Hospital in cases of illness or accident, provided that the cost to the College of such treatment shall not exceed seventy-five dollars for any one person in any one year. Except in cases of emergency, hospital arrangements are to be made through the college office.

The following estimates represent the fixed annual expenses, not including room-rent or the non-resident fee: —

| | School of Liberal Arts | Engineering School |
|---|---|---|
| Tuition . . . . . . . . . . . . . . . | $125.00 | $175.00 |
| Physical Education, including gymnasium and grounds and T.C.A.A. ticket . . . . . . | 15.00 | 15.00 |
| Reading-room . . . . . . . . . . . . . | 1.00 | 1.00 |
| Board, $4.50 a week, (36 weeks) . . . . . | 162.00 | 162.00 |
| Total . . . . . . | $303.00 | $353.00 |
| Registration fee, at the beginning of the course | $5.00 | $5.00 |

Special students in the School of Liberal Arts pay the initial registration fee and $20.00 a term for each subject of three hours a week or less, together with the usual laboratory fees.

## STUDENTS' DRAFTS

The College issues drafts for the use of students in books of twenty-five to fifty dollars. These are freely negotiable in the college community and are becoming so in all banks and stores in greater Boston. No commission is charged, and the holder is protected from loss or theft. The drafts are for sale at the Bursar's office and at the College Book Store.

## INSURANCE

Arrangements may be made through the Bursar's office whereby students in any of the dormitories can insure their personal effects, including books, furniture, and wearing apparel. The cost of such insurance is fifty cents for one hundred dollars for one year. Insurance is placed only in multiples of one hundred dollars; no risk is taken for less than one hundred dollars, and all premiums are payable in advance.

## THE DORMITORIES

East, West, Dean, Paige, and Curtis Halls are arranged with convenient rooms in suites, are warmed by steam, lighted by gas or electricity, and have good modern plumbing. These halls provide rooms for two hundred and fifty men.

## REGULATIONS CONCERNING COLLEGE ROOMS

The annual assignment of rooms will take place in the month of May, at a time appointed by the Bursar, due notice being given upon the official bulletin board. Students occupying any room may retain it for the following academic year by signing a new room-agreement. All rooms not thus provided for will be offered for rent to members of the three upper classes. Rooms not assigned at the annual allotment will be open for choice to members of the entering class, in the order of application.

The right to occupy a college room is given only to the student or students to whom it is assigned: neither exchanges nor transfers of rooms are allowed, except by consent of the Bursar. Room agreements are made for the college year.

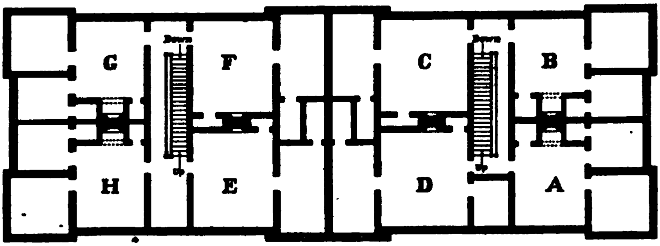
All rooms are for two students, except East 3, 12, 19, 22, 27, and 32, West 16½, and Curtis 4 and 12, and all rooms in Paige, which are for a single student each. Where more than two students occupy a room, the rent will be increased proportionately.

Each student receives his key on payment of fifty cents, which is refunded on the return of the key at the close of the college year.

The prices given for room rent in the lists below are for the whole room during the academic year, and include heat and care. The rooms are lighted with gas; Paige Hall has electricity also. Each suite is metered separately, and the occupants pay for the gas actually consumed. None of the rooms is furnished.

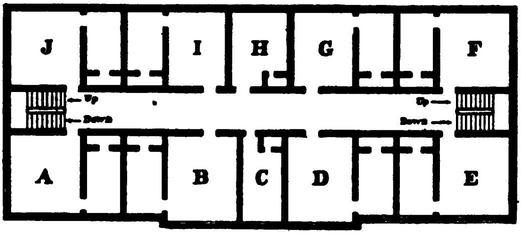
Room rent is in accordance with the following diagrams and prices:—

### WEST HALL



| FIRST FLOOR | | | SECOND FLOOR | | | THIRD FLOOR | | | FOURTH FLOOR | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 1 | $128 | A | 5 | $160 | A | 9 | $140 | A | 13 | $96 |
| B | 2 | 102 | B | 6 | 128 | B | 10 | 118 | B | 14 | 80 |
| C | 3 | 92 | C | 7 | 100 | C | 11 | 96 | C | 15 | 74 |
| D | 4 | 128 | D | 8 | 150 | D | 12 | 140 | D | 16 | 96 |
| E | 17 | 128 | E | 21 | 150 | E | 25 | 140 | E | 29 | 96 |
| F | 18 | 92 | F | 22 | 100 | F | 26 | 96 | F | 30 | 74 |
| G | 19 | 102 | G | 23 | 128 | G | 27 | 118 | G | 31 | 80 |
| H | 20 | 128 | H | 24 | 160 | H | 28 | 140 | H | 32 | 96 |

### EAST HALL

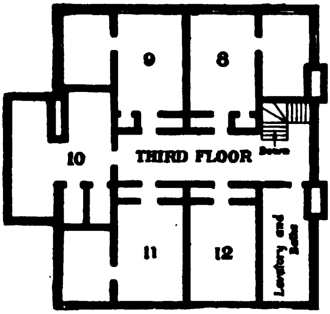


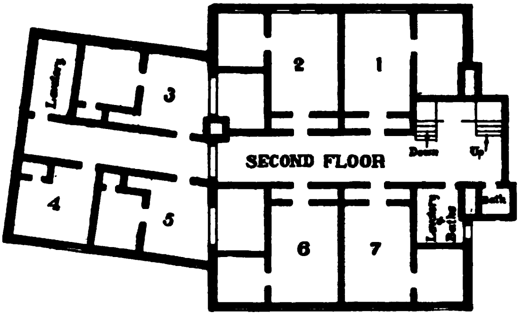
## EAST HALL

(See previous page for plan)

| BASEMENT | FIRST FLOOR | SECOND FLOOR | THIRD FLOOR |
|---|---|---|---|
| A | A 6 . . $ 96 | A 15 . . $110 | A 25 . . $102 |
| B | B 7 . . 92 | B 16 . . 110 | B 26 . . 100 |
| C | C | C 17 . . 43 | C 27 . . 40 |
| D | D 8 . . 92 | D 18 . . 110 | D 28 . . 100 |
| E | E 9 . . 100 | E 19 . . 118 | E 29 . . 110 |
| F 1 . . $60 | F 10 . . 100 | F 20 . . 110 | F 30 . . 100 |
| G 2 . . 55 | G 11 . . 80 | G 21 . . 86 | G 31 . . 80 |
| H 3 . . 30 | H 12 . . 40 | H 22 . . 43 | H 32 . . 40 |
| I 4 . . 55 | I 13 . . 80 | I 23 . . 86 | I 33 . . 80 |
| J 5 . . 60 | J 14 . . 86 | J 24 . . 90 | J 34 . . 86 |

## CURTIS HALL

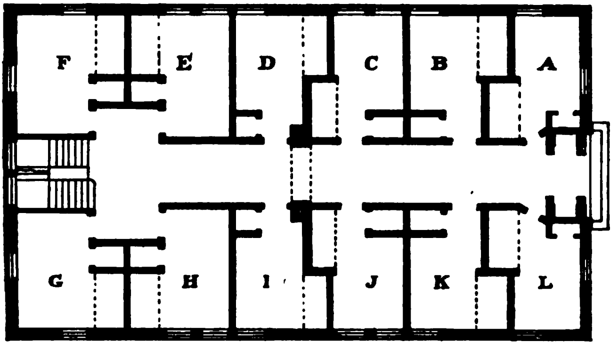




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 . . | $80 | 4 . . | $ 50 | 7 . . | $85 | 10 . . | $85 |
| 2 . . | 80 | 5 . . | 100 | 8 . . | 85 | 11 . . | 85 |
| 3 . . | 90 | 6 . . | 85 | 9 . . | 85 | 12 . . | 45 |

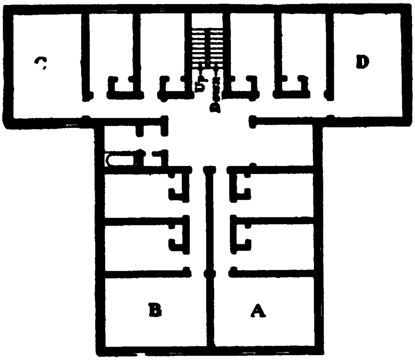
Nos. 4 and 12 are single rooms.

## PAIGE HALL



In Paige Hall the plan of each floor is the same. From A to L, the rooms are numbered from 1 to 12 on the first floor; from 13 to 24 on the second, and from 25 to 36 on the third floor. The price for each room is $75.

## DEAN HALL



| FIRST FLOOR | SECOND FLOOR | THIRD FLOOR | BASEMENT |
|---|---|---|---|
| A 1 . . $160 | A 5 . . $160 | A 9 · · $160 | A 13 . . $85 |
| B 2 · · 160 | B 6 . . 160 | B 10 . . 160 | B 14 . . 85 |
| C 3 . . 160 | C 7 . . 160 | C 11 . . 160 | C |
| D 4 . . 160 | D 8 . . 160 | D 12 · · 160 | D |

## SCHOLARSHIPS

Awards of scholarships are made by the Board of Trustees, on the recommendation of the Faculty. Applications for scholarships must be filed with the Registrar on blanks furnished for the purpose, on or before the first day of October; and, if the applicant be a minor, must be sanctioned by his parent or guardian. Grants of aid will apply only for the year in which granted, and will not in themselves be ground for continuance of assistance. If scholarship aid is desired during the following year, a new application must be filed.

All students desiring scholarships will be requested to file answers to specific questions on a blank provided for this purpose. In the case of a new student this blank must be accompanied by a letter from the principal of the school last attended, containing a statement as to the applicant's character and especially as to his standing as a student. In order to enable students to make financial plans for their first year these papers may be filed during the summer vacation, and the applicant may, if there appears to be real need and good ability, receive assurance of aid for the first half of the Freshman year.

After the first half of the Freshman year, continuance of aid will depend upon the student's need and the grade of his work. Students are required to attain for graduation a grade of at least C in a certain proportion of their work. No student is considered eligible for scholarship aid who has, in the preceding year or term, failed to meet this requirement.

The following conditions must be strictly observed by the applicant:

(*a*) His expenditure must be moderate, and strictly in accordance with his declaration of limited means.

(*b*) He must be regular in attendance.

(*c*) He must be guilty of no behavior reflecting upon his moral character or subversive of good order in the College.

Applicants residing in college dormitories will be given preference over those residing at home.

*Scholarships are available for those students only whose term bills are fully paid within ten days after such bills shall have become due.*

The following scholarships have been founded in the College. Except in special cases, when the donor has otherwise stipulated, the Trustees will award scholarship aid in such sums as they may determine in each case.

THREE STATE SCHOLARSHIPS.—Established in accordance with a resolve of the Commonwealth.

FIVE HOWLAND SCHOLARSHIPS.—Established from the income of the bequest of the late Edwin Howland, of South Africa.

FIVE WALKER MATHEMATICAL SCHOLARSHIPS.—Established in honor of the late William J. Walker, M.D., of Newport, R. I., and payable from the income of the Walker Fund.

TWO MOSES DAY SCHOLARSHIPS.—Founded by the late Moses Day, of Roxbury.

THE A. A. MINER SCHOLARSHIP.—Founded by the late Alonzo Ames Miner, D.D., of Boston.

THE REBECCA T. ROBINSON SCHOLARSHIP.—Founded by the late Charles Robinson, LL.D., of Newton.

THE WILLIAM OSCAR CORNELL SCHOLARSHIP.—Founded by the late William Oscar Cornell, of Providence, R. I.

THE LAURA A. SCOTT SCHOLARSHIP.—Founded by Mrs. Laura A. Scott, of Ridgefield, Conn.

THE STOW SCHOLARSHIP.—Founded by the late Mrs. Eugenia D. Stow, of Meriden, Conn.

THE NORCROSS SCHOLARSHIP.—Founded by James A. and Mrs. Mary E. Norcross, of Worcester.

THE ANDERSON SCHOLARSHIP.—Founded by John M. Anderson, of Salem, in the name of John M. and Rebecca Anderson.

THE TRAVELLI SCHOLARSHIP.—Founded by Mrs. Emma R. Travelli, of Newton.

THE WHITTIER SCHOLARSHIP.—Founded by the late Charles Whittier, of Roxbury, in the name of Charles and Eliza Isabel Whittier.

THE TALBOT SCHOLARSHIP.—Founded by the late Newton Talbot, of Boston.

THE SIMONS MEMORIAL SCHOLARSHIP.—Founded by Mrs. Mary A. Simons, of Manchester, N. H., in memory of Hiram H., Augustus, and Frank Simons.

THE AMASA AND HANNAH L. WHITING SCHOLARSHIP.—Founded by the late Mrs. Hannah L. Whiting, of Hingham.

**THE MARTHA GOLDTHWAITE MEMORIAL SCHOLARSHIP.**—Founded by the late Willard Goldthwaite, of Salem.

**THE ANDREW J. CLARK MEMORIAL SCHOLARSHIP.**—Founded by Mrs. Abbie B. Clark, of Orange.

**THE SARAH E. SAYLES MEMORIAL SCHOLARSHIP.**—Founded by the late Albert W. Sayles, of Lowell.

**THE COUSENS SCHOLARSHIP.**—Founded by the late John E. Cousens, of Brookline, in the name of John E. and Sarah C. Cousens.

**THE BENJAMIN F. SPINNEY SCHOLARSHIP.**—Founded by Benjamin F. Spinney, of Lynn.

**THE HENRY F. BARROWS SCHOLARSHIP.**—Founded by Henry F. Barrows, of North Attleboro.

**THE ELLERY E. PECK MEMORIAL SCHOLARSHIP.**—Founded by the late Henry Rollins, of Bangor, Me.

**THE J. H. MORLEY MEMORIAL SCHOLARSHIP.**—Founded by Herbert Small Morley, of Templeton.

**THE EDWIN H. CHAPIN MEMORIAL SCHOLARSHIP.**—Founded by friends of the late Edwin Hubbell Chapin, D.D., in New York City.

**THE THOMAS A. GODDARD MEMORIAL SCHOLARSHIP.**—Founded by the late Mrs. Mary T. Goddard, of Newton.

**THE HOSEA BALLOU, 2D, MEMORIAL SCHOLARSHIP.**—Founded by the late Mrs. Mary T. Goddard, of Newton.

**THE HENRY E. COBB SCHOLARSHIP.**—Founded by the late Henry E. Cobb, of Boston.

**THE MARY ANN WARD SCHOLARSHIP.**—Founded by Sylvester L. Ward, of Boston.

**THE MARIA P. WINN SCHOLARSHIP.**—Established from a bequest of the late Mrs. Maria P. Winn, of Woburn.

**THE JOSEPH D. PEIRCE MEMORIAL SCHOLARSHIP.**—Founded by the children and other relatives of the late J. D. Peirce, D.D., of Attleboro.

**TWO SIMMONS SCHOLARSHIPS.**—Founded by the late Robert F. Simmons, of Attleboro, in the name of Mary F. and Robert F. Simmons.

**THE JOSHUA S. AND HARRIET N. WHITE SCHOLARSHIP.**—Founded by the late Joshua S. White, of Pawtucket, R. I.

**THE JOHN B. PERKINS SCHOLARSHIP.**—Founded by the late Ann Maria Perkins, of Medford.

**THREE BARNARD SCHOLARSHIPS.**—Founded by the late Mrs. Caroline M. Barnard, of Everett.

**THE RICHARD PERRY BUSH SCHOLARSHIP.**—Founded by the late Mrs. Caroline M. Barnard, of Everett.

**THE BARTLETT SCHOLARSHIP.**—Founded by the late Mrs. Nancy Bartlett, of Milford.

THE B. H. DAVIS SCHOLARSHIP.—Founded by the Rev. B. H. Davis, of Weymouth, for the benefit of students of the College of Letters who are preparing to enter the Christian ministry.

THE LATIMER W. BALLOU SCHOLARSHIP.—Founded by the late Latimer W. Ballou, of Woonsocket, R. I.

THE NATHANIEL WHITE SCHOLARSHIP.—Founded by Armenia S. White, of Concord, N. H.

THE LIZZIE P. ALLEN SCHOLARSHIP.—Founded by the late Lizzie P. Allen, of Derby Line, Vermont.

THE RHODE ISLAND SCHOLARSHIP.—Founded by several persons in Rhode Island.

TWO CHARLES AND FANNIE A. MINER BOOTH SCHOLARSHIPS.—Founded by the late Charles Booth, of Springfield, Vermont.

THE LUTHER GILBERT SCHOLARSHIP.—Founded by the late Mrs. Luther Gilbert, of Roxbury.

THE ORMSBEE CLASS SCHOLARSHIP.—Founded by Benjamin F. Smith, of Pawtucket, R. I.

THE JAMES M. AND EMILY COOK SCHOLARSHIP.—Founded by Henrietta J. States, of Boston.

THE WILLIAM H. SHERMAN SCHOLARSHIP.—Founded by the late William H. Sherman, of Cambridge.

THE DAVIS COOK SCHOLARSHIP.—Founded by the late Davis Cook, of Cumberland, R. I.

THE AUSTIN B. FLETCHER SCHOLARSHIP.—Founded by Austin Barclay Fletcher, of New York City.

THE JONAS CLARK WELLINGTON SCHOLARSHIP.—Founded by Mrs. Sarah C. Fisher Wellington, of Cambridge.

THE MARY L. GROCE SCHOLARSHIP.—Founded by the late Mary L. Groce, of Roxbury.

THE JOHN MURRAY SPRAGUE AND ELIZA FLETCHER SPRAGUE SCHOLARSHIP.—Founded by the late John Sprague, of Lowell.

THE MARY A. RICHARDSON SCHOLARSHIP.—Founded by the late Mrs. Mary A. Richardson, of Worcester.

TWO WARREN SCHOLARSHIPS.—Founded by the late Dr. Ira Warren of Boston.

FOUR HANNAH S. MOULTON SCHOLARSHIPS.—Founded by the late Hannah S. Moulton of Kensington, N. H.

TRUSTEE SCHOLARSHIPS.—A limited number of special scholarships of one hundred dollars each are available for needy students in the School of Liberal Arts who reside in college dormitories.

The following scholarships of fifty dollars each are awarded annually:—

THE A. A. MINER SCHOLARSHIP.—Founded by the late Alonzo Ames Miner, D.D., of Boston.

THE PERKINS SCHOLARSHIP.—Founded by the late James D. Perkins, of New Rochelle, N. Y.

THE MOSES DAY SCHOLARSHIP.—Founded by the late Moses Day, of Roxbury.

THE JOSEPH H. WALKER SCHOLARSHIP.—Founded by the late Joseph H. Walker, of Worcester.

THE GEORGE C. THOMAS SCHOLARSHIP.—Founded by George C. Thomas, of Philadelphia, Pa.

THE ALBERT W. SAYLES SCHOLARSHIP.—Founded by the late Albert W. Sayles, of Lowell.

THE LIZZIE P. ALLEN SCHOLARSHIP.—Founded by the late Lizzie P. Allen, of Derby Line, Vermont.

THE CHARLES A. AND CORNELIA B. SKINNER SCHOLARSHIP.—Founded by the late Rev. Charles A. Skinner, D.D., and Mrs. Cornelia B. Skinner, of Cambridge, Mass.

THE GEORGE STEVENS BALLARD SCHOLARSHIP.— Founded by the late Caroline D. M. Ballard, of Augusta, Me.

The following scholarships are awarded under special conditions:—

THE GREENWOOD PRIZE SCHOLARSHIP IN ORATORY.—Founded by the late Mrs. Eliza M. Greenwood, of Malden, and given to such student as shall have made, as the result of faithful work, together with at least a fair degree of attainment, the greatest improvement in Oratory.

THE WENDELL PHILLIPS MEMORIAL SCHOLARSHIP.—Founded to perpetuate the name, fame, and influence of Wendell Phillips. This scholarship is to be awarded to a student who has completed the Freshman and Sophomore years, and he is to have the benefit of it during the remainder of his course. The beneficiary must be of sound body, high character, and ability in declamation and debate, and must comply with certain special conditions, including participation in a competitive debate of the applicants at the end of the Sophomore year. The specific conditions governing the award of this scholarship may be obtained by those intending to apply therefor from the Secretary of the Faculty, to whom application should be made early in the Sophomore year. The income of this scholarship is at present seventy dollars.

THE MOSES TRUE BROWN SCHOLARSHIP.—A scholarship yielding fifty dollars annually, founded by the late Moses True Brown, of Sandusky, Ohio, formerly Professor of Oratory in Tufts College, for encouraging and assisting worthy students in the department of Oratory.

THE PRIZE SCHOLARSHIP OF THE CLASS OF 1898.—The sum of fifty dollars is given annually by the Class of 1898 to that Senior who at the end of the Junior year shall have maintained the highest excellence in a course of study broadly and wisely chosen.

THE PRIZE SCHOLARSHIP OF THE CLASS OF 1882. — The sum of one hundred dollars is given annually by the class of 1882 to that member of the College who best exemplifies the combination of ability in athletics and excellence in scholarship.

## PRIZES

GODDARD PRIZES.— Three prizes of fifteen dollars each are assigned annually from the Goddard Prize Fund. In 1914–15 these prizes will be awarded in the departments of French, Political Science, and Chemistry, under the following conditions:

FRENCH.—A prize for that member of the class in French 4 who has done the most proficient work in the subject.

POLITICAL SCIENCE.—A prize for the best thesis by a student in Political Science on a subject to be approved by the head of the department. Theses prepared for courses will be accepted in competition.

CHEMISTRY.—A prize for that member of the class in Chemistry 35-2 who has done the most proficient work in Chemistry 1 and Chemistry 35-2.

RHETORICAL PRIZES.—Three prizes are awarded as follows :—

A first prize of forty dollars, a second prize of thirty dollars, and a third prize of twenty dollars. The preliminary competition will be open to all candidates for the degree of A.B. B.S., and B.D.

The rhetorical prizes are awarded by a committee, chosen by the Faculty, who judge the work presented by the competitors upon the public day appointed for that purpose. In order to enter the public competition, candidates, as well as their selections, must be approved by the Instructor in Oratory. A preliminary competition is held about ten days before the competition announced in the calendar, at which a committee of the Faculty determine the contestants in the final and public readings.

THE DE WITT C. TOMLINSON PRIZE SCHOLARSHIPS.—Founded by Rev. Irving C. Tomlinson, of Brookline, Mass.

Two prizes of thirty and twenty dollars respectively, for the two best essays on the subject of "The Ministry of Christ Jesus." The award of prizes must take into account (1) literary merit; (2) evidence of thorough study, clear insight, and unbiased understanding of the Biblical records of the ministry of Christ Jesus; (3) the treatment of the public and private ministration to those of his own time; (4) the treatment of the universal application of his ministry to all human needs, and (5) the treatment of the means by which the benefits of his ministry may be appropriated by his followers.

These prizes are open to Seniors in The School of Liberal Arts, the Engineering School, the Theological School, and Jackson College, and to members of the Graduate School. Details as to conditions of competition may be obtained at the Secretary's office.

The foregoing prizes are not awarded, unless in the opinion of the respective judges there is sufficient merit in the several contests to warrant their distribution.

A regular day has been appointed for the annual announcement of the award of prizes and the assignment of Commencement parts,— Wednesday of the week preceding the Thanksgiving recess.

## COMMITTEE ON STUDENT EMPLOYMENT

It is the object of the committee on student employment to inform students concerning positions which may give regular occupation during available hours of term time, or which may be temporarily filled during the vacation periods. Students who wish to make application for any occupation should register their names, with a statement of their qualifications for any special work, with Professor WILLIAM H. REED, Chairman of the Employment Committee, Ballou Hall.

# Buildings and Equipment

The College buildings are twenty in number. Ballou Hall contains recitation-rooms, and the offices of the President, the Dean, the Registrar, and the Bursar. Other buildings are Barnum Museum; Goddard Chapel; Miner Hall; Goddard Gymnasium; the Eaton Library; the Chemical Building; Jackson Gymnasium; three dormitories,—East Hall, West Hall, Dean Hall, for men; Curtis Hall, containing the post-office, class-rooms, and rooms for students; Metcalf Hall, and Start and Richardson Houses, for students of Jackson College. The Bromfield-Pearson School building is available for technical courses of the College. Two buildings, Packard Hall and Paige Hall, are devoted to the use of the Theological School. Robinson Hall provides for work in certain of the physical sciences. A power-house has been added, which supplies light, heat, and power to the engineering buildings.

## EATON MEMORIAL LIBRARY

The new library building, erected through the gift of one hundred thousand dollars by Mr. Andrew Carnegie, is called the Eaton Memorial Library, in honor of the late Charles Henry Eaton, '74, former pastor of the Church of the Divine Paternity, New York City.

In all, about seventy thousand bound volumes and fifty-seven thousand pamphlets are available for use. The College regularly receives more than two hundred periodicals. By favor of the late Senator Hoar the library is a depository for government publications. In the library building a reading-room, maintained by the students, supplies the daily and weekly papers. The student fund also provides a number of the popular and the more technical magazines. Separate rooms have been provided with facilities for the use of students working in the departments of History and Public Law, the Ancient Languages, the Modern Languages, Music, English, the Fine Arts, Philosophy, Political Science, Physics and Mathematics. The average annual increase by donation and purchase, for the last five years, has been about two thousand four hundred volumes.

In the general library is the collection of the Universalist Historical Society (six thousand volumes and several thousand pamphlets), to which, on application, students have free access. In Packard Hall is a selected reference library, for the use of theological students. In the Barnum Museum is the department library of Natural History, numbering more than thirty-three hundred volumes and over eight thousand pamphlets. The Metcalf Musical Library is divided between the music rooms in Goddard Gymnasium, where the scores are kept, and the department room in the Eaton Memorial Library, which contains the collection of English works relating to music. About four hundred representative musical compositions, in form for use upon the automatic instruments in the music rooms, are available to students.

The library is open to all members of the College daily except Sundays and holidays, from 8.00 A.M. to 5.30 P.M.

## BARNUM MUSEUM

The Barnum Museum of Natural History was built in 1883–84 by the late Phineas T. Barnum, who gave the College a fund for its maintenance and for the addition of two wings to the central building. One of these wings has been erected. In addition to laboratory rooms, it affords space for the display of the mineralogical and geological collections.

The College is also indebted to Mr. Barnum for the larger portion of its zoological collection. This serves to illustrate all groups of the animal kingdom, and is especially rich in skeletons and mounted skins of mammals, the whole being well adapted for the purposes of instruction. The botanical collection consists of an herbarium containing a representation of the flora of New England, besides many specimens from Europe and the southern and western States. The geological collection contains representatives of the various types of rocks, as well as of fossils from all formations. The mineralogical collection embraces fine examples of most of the species.

The laboratories and lecture-rooms of the department of Geology are in the main Museum building. The geological laboratory is provided with petrological microscopes, instruments for making rock sections, and other instruments. The mineralogical laboratory possesses the apparatus necessary for the determination of minerals, the analysis of ores, and assay work. The biological laboratories are in the main building and in the newly-erected wing. The laboratories for elementary work are furnished with all necessary facilities, while the laboratory for advanced and research work has all the appliances needed for investigation on the lines of anatomy, histology, and embryology.

The Barnum Museum is open for the inspection of visitors from 8.30 A.M., to 5.00 P.M., every day except Sundays and legal holidays.

## GODDARD GYMNASIUM

Goddard Gymnasium, the gift of Mrs. Mary T. Goddard, is well adapted to provide the prescribed class and individual work, and to furnish wholesome physical exercise for all. It is fitted with the apparatus usually seen in a good modern gymnasium, including facilities for light and heavy gymnastics, fencing, wrestling, basket ball, base ball, and the many indoor athletic sports. In the offices is a full set of anthropometric instruments for the physical examination of all students. There is a large gallery, with padded running track twenty-four laps to the mile. The dressing rooms, lockers, and baths are well lighted and commodious. The building is heated by steam and lighted by electricity.

The third floor is occupied by the department of Music.

## ATHLETIC FIELDS

The old campus is just outside the gymnasium, and on it are tennis-courts, base-ball diamonds, a foot-ball field, and a board track. Its close proximity to the Gymnasium is of great advantage.

Tufts College Athletic Field is the large inclosed field on

College Avenue, where inter-collegiate contests are played. It includes two base-ball diamonds, a foot-ball field, and a quarter-mile, twenty-foot cinder track,.for track athletics. Tennis-courts and a separate gymnasium are provided for women students, not far from Metcalf Hall.

While athletics are encouraged and generously supported by the College, they are made subsidiary to the requirements of the curriculum, thus safeguarding the best interests of the student.

### CHEMICAL BUILDING

The building of the department of Chemistry contains laboratories for general inorganic, organic, analytical, and metallurgical chemistry, a large lecture-room, library, and weighing room, and the private laboratories of the professors in charge. The rooms are provided with modern laboratory conveniences, and are well supplied with apparatus and chemicals.

### ROBINSON HALL

Robinson Hall is a memorial to the late Charles Robinson, and is designed for the use of the Engineering School. It contains the laboratories for the Departments of Physics and Electricity and some of the laboratory equipment for the Departments of Civil and Mechanical Engineering. Beside these laboratories there are recitation rooms, a lecture hall and offices for the instructors. The drafting rooms for the Civil and Structural Departments are also in this building. It is well lighted by electricity, and heated from an adjoining steam plant by direct and indirect methods.

### BROMFIELD-PEARSON BUILDING

The Bromfield-Pearson Building is largely used by the Department of Drawing and Mechanic Arts. It contains the office of the Dean together with the library and offices of the Department of Mechanical Engineering. Abundant and uniform light is provided, and the drafting rooms are separated from the noise and confusion of the shops. One end of the building is used exclusively by the pattern and machine shops, and both are well equipped with modern tools and facilities for conducting the class work in mechanic arts. Electricity from the college plant is used for lighting and power throughout the building.

## THE POWER STATION

The Power Station is equipped with a one hundred and twenty-five horse-power boiler, which supplies heat and power to the engineering buildings. It is also piped and equipped for experimental work in steam engineering, and may be run by forced or natural draft. A Harrisburg Standard engine directly coupled to a direct current General Electric generator furnishes current for lighting, power, and experimental purposes.

## LABORATORIES

The engineering laboratories that are located in Robinson Hall and the Power Station are well equipped for the experimental work prescribed in the curriculum.

The Civil Engineering Laboratories contain the Cement and Highway testing apparatus including abrasion machines for paving material and the necessary instruments and machines for testing cement and highway materials. The Hydraulic Laboratory is equipped with a 600 gallon Worthington duplex steam pump, a 300 gallon Lawrence centrifugal pump, steam pulsometer, Pelton water wheel and a Gould hydraulic ram. A 4500 gallon channel serves for supply and discharge from the several pumps and contains a rectangular and a triangular weir, together with the necessary apparatus, meters, gauges, etc., for the measurement of water. The surveying apparatus consists of nine transits, six of which are fully equipped and two are adapted to precise triangulation; seven engineers' levels representing various types and makes; three plane table outfits; sextants, hand levels, compasses, and a full complement of the usual auxiliary apparatus.

The Electrical Laboratories are well equipped for electrical testing. Alternating current power is obtained from the circuits of the Edison Electric Illuminating Co., both three phase and single phase being used. The direct current power is obtained from the Tufts College power plant which contains both generators and a storage battery. The apparatus includes a great variety of portable instruments for the measurement of electro-motive force, current and power, together with numerous generators, motors, transformers and accessories for experimental work. A standard wattmeter, potentiometer, and Weston Laboratory Standard meters provide convenient means for checking the accuracy of the portable instruments. Connected with the laboratories is a photometer room with suitable equipment for measurements on standard types of lamp. A General Electric University Alternator, single and polyphase induction motors, transformers of various capacities, and other apparatus both standard and special are to be found in the dynamo laboratory. A number of the direct current dynamos specially adapted to experimental purposes have been designed and constructed by the students in the shops of the institution.

The Mechanical Engineering Laboratory equipment includes a Corliss engine with Admiralty condenser, a 15 Kilowatt Curtiss steam turbine and a variety of smaller engines, stationary and marine, of the plain slide valve, piston valve and riding cutoff valve types. There are gas and gasoline engines of from one to four cylinders representing a variety of makes. An automobile and motorcycle testing plant is also included in the equipment. Absorption and brake dynamometers are used for the measurement of power and other machines are provided for oil testing, compressed air and fan tests. The equipment includes a good assortment of indicators, calorimeters, gauges, etc., for the variety of measurement required in a power engineering laboratory.

An extension to this building provides accommodation for the forge shop and such of the equipment of the Mechanical Engineering Department as cannot be accommodated in Robinson Hall.

# ENGINEERING SCHOOL

# Faculty of the Engineering School

RESIDENCE*

WILLIAM L. HOOPER, A.M., PH.D., ACTING PRESIDENT,
*and Professor of Electrical Engineering* 124 Professors Row

GARDNER C. ANTHONY, A.M., SC.D., DEAN . . 14 Professors Row
*Professor of Technical Drawing. Acting Head of Department of Mechanical Engineering*

WILLIAM H. REED, JR., A.M., SECRETARY . 81 Walnut Ave., Roxbury
*Assistant Professor of Modern Languages*

ALFRED C. LANE, A.M., PH.D., SC.D. . . 1775 Massachusetts Ave.,
*Pearson Professor of Geology and Mineralogy* Cambridge

FRANK B. SANBORN, C.E., M.S. . . 8 Buena Vista Park, Cambridge
*Professor of Civil Engineering*

FRANK W. DURKEE, A.M. . . . . . . . . . . . 38 Professors Row
*Professor of Inorganic Chemistry*

EDWARD H. ROCKWELL, S.B. . . . 133 Powder House Boulevard,
*Professor of Structural Engineering* W. Somerville

CHARLES H. CHASE, S.B. . . . . . . . . . 39 Lincoln St., Stoneham
*Professor of Steam Engineering*

SAMUEL C. EARLE, A.M. . . . . . . . . . . . . 45 Sawyer Avenue
*Professor of English*

HENRY C. METCALF, A.B., PH.D. . . 31 Sheffield Road, Winchester
*Jackson Professor of Political Science*

SAMUEL L. CONNER, B.S., M.S . . . . . . . . . 23 Bellevue St.
*Assistant Professor of Railroad Engineering*

WILLIAM R. RANSOM, A.M. . . . . . . . . . . 29 Sawyer Avenue
*Professor of Mathematics*

GEORGE F. ASHLEY . . . . . . . . . . . 47 Avon St., Somerville
*Assistant Professor of Technical Drawing*

EDWIN B. ROLLINS, B.S. . . . . . . . . . . . . . 38 Capen St.
*Assistant Professor of Electrical Engineering*

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*The post office address is Tufts College, Mass., unless otherwise indicated.

PHILIP H. COBB, A.B., PH.D. . . . . . . . . . . . . . Dean Hall, 5
*Assistant Professor of Organic and Physical Chemistry*

MELVILLE S. MUNRO, B.S. . . . . . . . . . . . 101 Talbot Avenue
*Assistant Professor of Electrical Engineering*

FRANK E. SEAVEY, A.B. . . . . . . . . . . . . . 45 Sawyer Ave.
*Assistant Professor of English*

HENRY H. MARVIN, B.S., PH.D. . . . . . . . . 59 West Adams St.
*Assistant Professor of Physics*

RICHARD C. SMITH, B.S. . . . . . . . . 15 Warren St., W. Medford
*Assistant Professor of Structural Engineering*

ALEXANDER DILLINGHAM, A.M. . . . . . . . . . 54 Curtis Ave.
*Assistant Professor of Mathematics*

HOWARD H. CARROLL, S.B. . . . . . 66 Wyman St., W. Medford
*Assistant Professor of Technical Drawing.*

FRANK W. POTE, B.S. . . . . . . . . . . 9 Marshall St., Medford
*Instructor in Physics*

CONRAD A. ADAMS, B.S. . . . . 38 Whitfield Rd., West Somerville
*Instructor in Mechanic Arts*

NATHANIEL H. KNIGHT, B.S. . . . . . . . . . . . 65 Pearson Rd.
*Instructor in Physics*

EDGAR MACNAUGHTON . . . . . . . . . . . . .
*Instructor in Mechanical Engineering*

CROSBY F. BAKER, M.S. . . . . . . . . . . . . . . . East Hall, 10
*Instructor in Chemistry*

MERRILL C. HILL, A.B. . . . . . . . . . . . . . . . West Hall, 17
*Instructor in Modern Languages*

HARRY P. BURDEN, B.S. . . . . . . . . . . . . . 22 Fairmount St.
*Instructor in Civil Engineering*

——— ——— . . . . . . . . . . . . . . . . . . . . . . ——— ———
*Instructor in English*

## COMMITTEE ON PROMOTIONS

Dean Anthony, *Chairman;* Professors Durkee, Rockwell, and Assistant Professors Ashley and Rollins.

## COMMITTEE ON CURRICULUM

Dean Anthony, *Chairman;* Professors Hooper, Sanborn, Durkee, Rockwell, Chase, and Earle.

## OTHER OFFICERS

| | |
|---|---|
| EUGENE E. SHEPARD . . . . . . . . . . . . . . . .<br>*Bursar* | W. Medford |
| LESLIE N. GEBHARD, LL.B . . . . . . . .<br>*Secretary to the Dean of the Engineering School* | 55 Fremont Ave., Everett |
| MASON E. BENNETT . . . . . . . . . . .<br>*Clerk in the Engineering School* | 71 School St., Somerville |

# Courses of Instruction

The School offers courses in CIVIL ENGINEERING, STRUCTURAL ENGINEERING, MECHANICAL ENGINEERING, ELECTRICAL ENGINEERING, and CHEMICAL ENGINEERING, each leading to the degree of Bachelor of Science, and requiring four years of study.

While much of the instruction is of a technical character relating to the several branches of engineering, the first aim of the School is toward a broad intellectual development, and an appreciation of the duties of the educated man. An effective correlation of the subjects serves to promote a great degree of unity and to secure an educational result both scientific and cultural.

During the first two years the course of study and elective privileges are the same for all departments. The importance of developing the power to write clear and concise English is emphasized by correlating this subject with the work of other departments, thus making it as much a fundamental for technical training as it is for a literary education. The required courses in Mathematics, Physics, and Chemistry, common to every field of engineering, are studied during this period, thus preparing the student for the applied subjects which characterize the work of the Junior and Senior years. A thorough course in the theory and practice of Technical Drawing and of Mechanic Arts is required in all departments during the first two years.

One hundred and forty term hours are required for graduation, this being the equivalent of about fifty-two hours of work per week. One term hour signifies one recitation per week for one term, or one laboratory period of three hours for a term, the recitation period implying two hours of preparation. A grade of C or higher must be obtained in at least 70 term hours.

On the pages immediately following the Courses of Instruction will be found an index of the subjects, which gives a complete view of the system of numbering. The figures following the names of subjects represent the credit in term hours.

Following this index will be found detailed descriptions of the subjects in numerical order.

Permission to take a program in excess of eighteen term hours, except when required by the curriculum, must be obtained by petition to the Committee on Promotions.

## FRESHMAN YEAR

[Alike for all courses.]

| First Term | | |
|---|---|---|
| 11-1 | English | 3 |
| 13-2 | †French or | 3 |
| 15-2 | †German | |
| 21-1 | Drawing | 5 |
| 29-1 | Mathematics | 3 |
| 29-2 | Mathematics | 3 |
| 88 | Physical Training | ½ |
| | Total | 17½ |

| Second Term | | |
|---|---|---|
| 11-2 | English | 3 |
| 13-2 | †French or | 3 |
| 15-2 | †German | |
| 21-5 | Descriptive Geometry | 3 |
| 25-1 | Mechanic Arts | 3 |
| 29-3 | Mathematics | 3 |
| 31-1 | Physics | 3 |
| 88 | Physical Training | ½ |
| | Total | 18½ |

## SOPHOMORE YEAR

[Alike for all courses.]

| First Term | | |
|---|---|---|
| 21-8 | Drawing | 3 |
| 29-4 | Mathematics | 3 |
| 31-2 | Physics | 3 |
| 31-7 | Physical Laboratory | 1½ |
| 35-1 | Chemistry | 3 |
| 41-3 | Surveying | 1 |
| 88 | Physical Training | ½ |
| | Total | 15 |

*Electives*

English, French or German.

| Second Term | | |
|---|---|---|
| 21-13 | Mechanism | 3 |
| 29-5 | Mathematics | 3 |
| 31-7 | Physical Laboratory | 1½ |
| 35-1 | Chemistry | 3 |
| 41-3 | Surveying | 2 |
| 45-21 | Mechanics | 3 |
| 88 | Physical Training | ½ |
| | Total | 16 |

*Electives*

English, French or German.

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†As the course to be pursued in modern language is dependent on the preparation of each student, definite instruction for the selection thereof is given at the time of registration.

## CIVIL ENGINEERING

The Civil Engineering graduates enter a great variety of positions. Their work may include municipal engineering, general surveying, water-supplies, sewerage, water-powers, bridges, mill buildings, fire protection, foundations, electric railroads, steam railroads, highways, or contracts and specifications; and these positions may require drafting, computations, or field construction. It therefore becomes the duty of the Department to qualify its students for various fields of employment. The basis of instruction is general engineering education and not specialization. In fact it is recommended that those students who find that they would like to specialize should plan to do so by a graduate year of study after their four years of general engineering education in the Civil Engineering course.

By referring to the detailed list of studies published on another page of this catalogue, it may be seen, however, that a student can select for his Senior year elective studies and a thesis which will give him opportunity to devote most of the year to his chosen field in railroads, hydraulics, or municipal engineering.

In order that the student may observe a direct application of the theory that he is studying, the Department conducts many laboratory and field courses. These include field practice in topographical and railroad surveying (for which the college location affords excellent advantages), river gaugings, and laboratory tests of metals, cements, road materials, and hydraulic appliances, beside trips of inspection, and tests at near-by industrial or municipal plants. This close association of theory and practice adds to the interest and progress of the student.

# CIVIL ENGINEERING

## JUNIOR YEAR

### First Term

| | | |
|---|---|---|
| 35-2 | Qualitative Analysis | 2 |
| 41-12 | Railroad Surveying | 3 |
| 41-40 | Hydraulics | 3 |
| 45-1 | Applied Mechanics | 3 |
| 45-12 | Applied Mechanics Laboratory | 1 |
| 51-1 | Steam Engine | 3 |
| 81-2 | Economics | 3 |
| | Total | 18 |

*Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| 54- | Geology | |

### Second Term

| | | |
|---|---|---|
| 41-13 | Railroad Engineering | 3 |
| 41-21 | Highways | 2 |
| 41-43 | Hydraulic Measurements | 2 |
| 45-2 | Applied Mechanics | 3 |
| 47-3 | Structural Design | 3 |
| 81-2 | Economics | 3 |
| | Total | 16 |

*Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| 54- | Geology | |

## SENIOR YEAR

### First Term

| | | |
|---|---|---|
| 41-14 | Railroad Engineering | 3 |
| 41-46 | Water Supplies | 3 |
| 41-95 | Civil Engineering Topics | 2 |
| 45-3 | Structural Mechanics | 3 |
| 47-1 | Roofs and Bridges | 3 |
| | Total | 14 |

*Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| 17-1 | Spanish | 3 |
| 35-18 | Chemistry of Road-building Materials | 3 |
| 41-47 | Water Power Engineering | 3 |
| 47-7 | Bridge Design | 3 |
| 64- | Mineralogy | |
| 66- | Economics | |

### Second Term

| | | |
|---|---|---|
| 41-48 | Sewerage | 3 |
| 41-63 | Contracts | 3 |
| 41-99 | Thesis | 3-5 |
| | Total | 9-11 |

*Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| 17-1 | Spanish | 3 |
| 35-18 | Chemistry of Road-building Materials | 3 |
| 41-17 | Railroad Economics | 3 |
| 41-31 | Geodesy | 2 |
| 41-51 | Fire Protection Engineering | 2 |
| 47-2 | Theory of Structures | 3 |
| 47-8 | Structural Design | 2 |
| 54- | Geology | |
| 66- | Economics | |

## STRUCTURAL ENGINEERING

The course of instruction in Structural Engineering is arranged so as to afford the student a comprehensive training in the fundamentals of civil engineering construction, and leads to the degree of Bachelor of Science in Civil Engineering. In addition to the subjects of the first two years, the course includes, as prescribed subjects, applied mechanics; testing of the materials of construction; stresses in framed structures; design of masonry and reinforced concrete structures and foundations; the design of buildings and bridges; hydraulics; sanitary engineering; steam engine; railroad surveying and economics. In addition to the prescribed subjects, it is possible for the student to elect courses in English, Spanish, mineralogy, geology, geodesy, contracts, dynamo electric machinery, highways, hydraulic engineering, railroad engineering, and advanced courses in mathematics.

The distinctive work of the course, however, is based upon the principles involved in the theory of structures, and in their design and construction. The study of this subject is commenced at the beginning of the junior year and is carried through two full years without intermission, partly in order to develop the power of concentration by the continued study of a highly mathematical and scientific body of co-ordinated principles, and partly because these same principles happen to be fundamental and therefore necessary for a complete understanding of civil engineering structures.

Special emphasis is laid upon the design by the student of typical structures which are likely to be met in practice. By this means he fixes in mind the principles of mechanics and obtains a truer perspective of their application for stability, safety, and economy of construction. The course is designed as an educational preparation not only for those who expect to follow construction professionally as engineers, but for others who may eventually be connected with public or private works as designers, inspectors or in administrative capacities.

## STRUCTURAL ENGINEERING

### JUNIOR YEAR

#### FIRST TERM

| | | |
|---|---|---|
| 35-2 | Qualitative Analysis | 2 |
| 41-12 | Railroad Surveying | 3 |
| 41-40 | Hydraulics | 3 |
| 45-1 | Applied Mechanics | 3 |
| 45-12 | Applied Mechanics Laboratory | 1 |
| 51-1 | Steam Engine | 3 |
| 81-2 | Economics | 3 |
| | Total | 18 |

*Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| 54- | Geology | |

#### SECOND TERM

| | | |
|---|---|---|
| 41-13 | Railroad Engineering | 3 |
| 41-21 | Highways | 2 |
| 41-43 | Hydraulic Measurements | 2 |
| 45-2 | Applied Mechanics | 3 |
| 47-3 | Structural Design | 3 |
| 81-2 | Economics | 3 |
| | Total | 16 |

*Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| 54- | Geology | |

### SENIOR YEAR

#### FIRST TERM

| | | |
|---|---|---|
| 41-46 | Water Supplies | 3 |
| 45-3 | Structural Mechanics | 3 |
| 47-1 | Roofs and Bridges | 3 |
| 47-7 | Bridge Design | 3 |
| 47-95 | Structural Topics and Reports | 2 |
| | Total | 14 |

*Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| 17-1 | Spanish | 3 |
| 41-14 | Railroad Engineering | 3 |
| 41-21 | Highways | 2 |
| 41-47 | Water Power Engineering | 3 |
| 64- | Mineralogy | |
| 66- | Economics | |

#### SECOND TERM

| | | |
|---|---|---|
| 47-2 | Theory of Structures | 3 |
| 47-8 | Structural Design | 2 |
| 47-99 | Thesis | 3-5 |
| | Total | 8-10 |

*Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| 17-1 | Spanish | 3 |
| 41-17 | Railroad Economics | 3 |
| 41-31 | Geodesy | 2 |
| 41-48 | Sewerage | 3 |
| 41-51 | Fire Protection Engineering | 2 |
| 41-63 | Contracts | 3 |
| 54- | Geology | |
| 66- | Economics | |

## ELECTRICAL ENGINEERING

The aim of this course is to lay a broad foundation of Electrical Science upon which the future technical attainments of the electrical engineer may rest.

The purely electrical work extends throughout the junior and senior years; that in the junior year being devoted to the more elementary theory, and the practice of the simpler tests and measurements, while that in the senior year is largely directed to the more advanced study of alternating currents and electrical machinery and to the more complicated tests of the alternating current and dynamo laboratories, and to the consideration of the general problems of Electrical Engineering.

Throughout the course much attention is paid to the numerical solution of electrical problems, as it is believed that in no other way can theory and principles be so quickly and so clearly comprehended. A considerable amount of time is given to the design of electrical apparatus and machinery and many students during their course construct or assist in the construction of some instrument or piece of electrical machinery of commercial finish and dimensions.

The graduates of this course are advised to spend a couple of years in the apprenticeship courses or testing departments of the large electrical manufacturing companies in order that they may get an intimate practical acquaintance with electrical apparatus and experience in handling and operating heavy machinery.

Everywhere the attempt is made to present the data and methods of Electrical Engineering by the scientific development of physical principles, it being assumed that the empirical side of the profession may best be acquired by practice after graduation.

# ELECTRICAL ENGINEERING

## JUNIOR YEAR

| FIRST TERM | | | SECOND TERM | | |
|---|---|---|---|---|---|
| 25-8 | Mechanic Arts | 3 | 41-41 | Hydraulics | 3 |
| 35-2 | Qualitative Analysis | 2 | 45-2 | Applied Mechanics | 2 |
| 45-1 | Applied Mechanics | 3 | 51-3 | Engineering Thermodynamics | 3 |
| 45-12 | Applied Mechanics Laboratory | 1 | 51-21 | Mechanical Engineering Lab. | 2 |
| 51-1 | Steam Engine | 3 | 61-5 | Alt. Current Machinery | 3 |
| 61-3 | Dynamo-Electric Machinery | 3 | 61-8 | Electrical Laboratory | 3 |
| 81-2 | Economics | 3 | 81-2 | Economics | 3 |
| | Total | 18 | | Total | 19 |
| | *Electives* | | | *Electives* | |
| 11- | English | | 11- | English | |
| 14- | Mathematics | | 14- | Mathematics | |

## SENIOR YEAR

| FIRST TERM | | | SECOND TERM | | |
|---|---|---|---|---|---|
| 61-12 | Dynamo Laboratory | 3 | 61-14 | Electricity | 3 |
| 61-14 | Electricity | 3 | 61-16 | Electrical Engineering | 3 |
| 61-15 | Electrical Engineering | 3 | 61-99 | Thesis | 3-5 |
| 61-23 | Dynamo Design | 3 | | | |
| | Total | 12 | | Total | 9-11 |
| | *Electives* | | | *Electives* | |
| 11- | English | | 11- | English | |
| 14- | Mathematics | | 14- | Mathematics | |
| 17-1 | Spanish | 3 | 17-1 | Spanish | 3 |
| 41-47 | Water Power Engineering | 3 | 41-63 | Contracts | 3 |
| 51-7 | Engine Design | 3 | 51-8 | Power Plant Design | 3 |
| 51-15 | Dynamics of Machinery | 3 | 51-28 | Mechanical Engineering Lab. | 3 |
| 51-17 | Mechanical Design | 3 | 61-95 | Electrical Topics | 2 |
| 51-26 | Mechanical Engineering Lab. | 3 | 66- | Economics | |
| 61-17 | Telephone and Telegraph | 3 | | | |
| 66- | Economics | | | | |
| 81-5 | Engineering Economics | | | | |

## MECHANICAL ENGINEERING

The course of instruction in mechanical engineering relates particularly to the generation and transmission of power; the design and construction of machinery; the economics of production and labor.

The subject of steam is begun with the Junior year and continued through the Senior year, giving full consideration to the mechanical theory of heat and the properties of steam and gases, based on the preparatory courses in physics and chemistry. It comprises the study of steam engines and boilers, together with their auxiliaries, by text book, laboratory tests, and design. Gas producers, gas engines, and turbines are also given the attention which their importance demands. Both required and elective courses in Electricity are given at the same time, thus giving the student a comprehensive treatment of the power problem.

The subject of mechanism is introduced in the Sophomore year and followed by the mechanics and dynamics of machinery in the Junior and Senior years. These courses are paralleled by laboratory practice and a thorough training in applied mechanics and the testing of materials. The courses in design are closely correlated with the development of theory, and supplemented by shop practice and many inspection trips to the industrial plants in the vicinity,

The third and equally important division of this course is the consideration of problems relating to the manufacture of machinery. This comprises the economic methods of production, and the consideration of labor problems. These subjects will be presented to the prospective engineer in such form as to enable him to comprehend their importance and the principles involved.

The course aims to give the graduate a thorough knowledge of the fundamentals in mechanical engineering so that he may successfully cope with the problems in the shop and engineering office, the power plant, or in factory organization and administrative engineering.

## MECHANICAL ENGINEERING

### JUNIOR YEAR

| FIRST TERM | | | SECOND TERM | | |
|---|---|---|---|---|---|
| 25-8 | Mechanic Arts | 3 | 41-41 | Hydraulics | 2 |
| 45-1 | Applied Mechanics | 3 | 45-2 | Applied Mechanics | 3 |
| 35-2 | Qualitative Analysis | 2 | 51-3 | Engineering Thermodynamics | 3 |
| 45-12 | Applied Mechanics Laboratory | 1 | 51-21 | Mechanical Engineering Lab. | 2 |
| 51-1 | Steam Engine | 3 | 61-5 | Alt. Current Machinery | 3 |
| 61-3 | Dynamo-Electric Machinery | 3 | 61-8 | Electrical Laboratory | 3 |
| 81-2 | Economics | 3 | 81-2 | Economics | 3 |
| | Total | 18 | | Total | 19 |
| | *Electives* | | | *Electives* | |
| 11- | English | | 11- | English | |
| 14- | Mathematics | | 14- | Mathematics | |

### SENIOR YEAR

| FIRST TERM | | | SECOND TERM | | |
|---|---|---|---|---|---|
| 51-7 | Engine Design | 3 | 51-8 | Power Plant Design | 3 |
| 51-15 | Dynamics of Machinery | 3 | 51-19 | Production Engineering | 3 |
| 51-17 | Machine Design | 3 | 51-28 | Mechanical Engineering Lab. | 3 |
| 51-26 | Mechanical Engineering Lab. | 3 | 51-99 | Thesis | 3 |
| | Total | 12 | | Total | 12 |
| | *Electives* | | | *Electives* | |
| 11- | English | | 11- | English | |
| 14- | Mathematics | | 14- | Mathematics | |
| 17-1 | Spanish | 3 | 17-1 | Spanish | 3 |
| 41-47 | Water Power Engineering | 3 | 41-63 | Contracts | 3 |
| 61-12 | Dynamo Laboratory | 3 | 51-95 | Mech. Engineering Topics | 2 |
| 61-14 | Electricity | 3 | 61-14 | Electricity | 3 |
| 61-15 | Electrical Engineering | 3 | 61-16 | Electrical Engineering | 3 |
| 61-23 | Dynamo Design | 3 | 66- | Economics | |
| 66- | Economics | | | | |
| 81-5 | Engineering Economics | 3 | | | |

## CHEMICAL ENGINEERING

The course in Chemical Engineering covers a period of four years, and leads to the degree of Bachelor of Science in Chemical Engineering.

The subjects in this course have been arranged to give the training in mathematics, physics, chemistry, and mechanical and electrical engineering that will assist the graduates of the department in solving the mechanical, electrical and chemical problems that present themselves when chemistry is applied in practical ways. Subjects intended for general training, the greater part of the pure mathematics, and the less technical engineering subjects have purposely been introduced early in the course. This arrangement allows much time for the study of subjects in chemistry and advanced engineering in the last two years. The mathematical, physical, and general engineering subjects, as well as subjects that are intended for general culture, correspond, for the most part, to those of the course in mechanical and electrical engineering.

In chemistry the subjects are numerous enough to train the student thoroughly in theoretical and descriptive inorganic and organic chemistry, to give him a working knowledge of the different branches of chemical analysis, and to make him familiar with many of the practical applications of chemistry. The chemical and engineering subjects are taught, so far as it is possible, in the laboratories, and excursions are made from time to time to plants where technical chemical operations are performed.

Young men who graduate from the course in chemical engineering find employment in constructing and operating plants where chemistry is applied commercially, such as gas-works, dye-works, bleacheries, paper and pulp mills, acid and alkali manufactories, and analytical laboratories.

# CHEMICAL ENGINEERING

## JUNIOR YEAR

### First Term

| | | |
|---|---|---|
| 35-2 | Qualitative Analysis | 2 |
| 35-4 | Quantitative Analysis | 3 |
| 35-10 | Organic Chemistry | 4 |
| 45-1 | Applied Mechanics | 3 |
| 45-12 | Applied Mechanics Laboratory | 1 |
| 51-1 | Steam Engine | 3 |
| 81-2 | Economics | 3 |
| | Total | 19 |

#### *Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| | German 15 or 22 | 3 |

### Second Term

| | | |
|---|---|---|
| 35-3 | Qualitative Analysis | 2 |
| 35-4 | Quantitative Analysis | 3 |
| 35-10 | Organic Chemistry | 4 |
| 41-41 | Hydraulics | 2 |
| 45-2 | Applied Mechanics | 3 |
| 81-2 | Economics | 3 |
| | Total | 17 |

#### *Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| | German 15 or 22 | 3 |
| 24-2 | Electricity and Magnetism | 3 |

## SENIOR YEAR

### First Term

| | | |
|---|---|---|
| 35-5 | Quantitative Analysis | 3 |
| 35-9 | Gas Analysis | 1 |
| 35-11 | Theoretical Chemistry | 3 |
| 35-17 | Applied Chemistry | 3 |
| 61-3 | Dynamo-Electric Machinery | 3 |
| | Total | 13 |

#### *Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| | German 15 or 22 | 3 |
| 17-1 | Spanish | 3 |
| 41-46 | Water Supplies | 3 |
| 54- | Geology | |
| 64- | Mineralogy | |
| 66- | Economics | |
| 81-5 | Engineering Economics | 3 |

### Second Term

| | | |
|---|---|---|
| 35-5 | Quantitative Analysis | 3 |
| 35-7 | Fire Assay | 2 |
| 35-8 | Metallurgy | 2 |
| 35-11 | Theoretical Chemistry | 3 |
| 35-17 | Applied Chemistry | 3 |
| 35-99 | Thesis | 3-5 |
| | Total | 16-18 |

#### *Electives*

| | | |
|---|---|---|
| 11- | English | |
| 14- | Mathematics | |
| | German 15 or 22 | |
| 17-1 | Spanish | 3 |
| 41-48 | Sewerage | 3 |
| 54- | Geology | 3 |
| 61-8 | Electrical Laboratory | 3 |
| 66- | Economics | |

# Index to Subjects

| No. | Term Hours | Subject |
|---|---|---|
| | | **11 ENGLISH** |
| 11-1 | 3 | English (First Term) |
| 11-2 | 3 | English (Second Term) |
| 11-4 | 2 | Narration |
| 11-5 | 3 | General English Literature |
| 11-6 | 2 | English Literature, 19th Century |
| [11-7 | 2 | Advanced English Literature] |
| 11-8 | 2 | Technical Exposition |
| 11-9 | 2 | Technical Theses |
| 11-13 | 3 | Argumentation |
| | | **13 FRENCH** |
| 13-1 | *6 | French |
| 13-2 | *6 | French |
| 13-3 | 3 | French |
| | | **15 GERMAN** |
| 15-2 | *6 | German |
| 15-3 | 3 | German |
| | | **17 SPANISH** |
| 17-1 | *6 | Spanish |
| | | **21 DRAWING** |
| 21-1 | 5 | Drawing |
| 21-5 | 3 | Descriptive Geometry |
| 21-8 | 3 | Drawing |
| 21-13 | 3 | Mechanism |
| | | **25 MECHANIC ARTS** |
| 25-1 | 3 | Pattern Making |
| 25-8 | 3 | Metal Work |
| | | **29 MATHEMATICS** |
| 29-1 | 3 | Computation |
| 29-2 | 3 | Analytical Geometry and Algebra |
| 29-3 | 3 | Freshman Calculus |
| 29-4 | 3 | Sophomore Calculus |
| 29-5 | 3 | Sophomore Calculus |
| | | **31 PHYSICS** |
| 31-1 | 3 | Mechanics and Sound |
| 31-2 | 3 | Electricity and Magnetism, and Light |
| 31-7 | §3 | Physical Laboratory |
| | | **35 CHEMISTRY** |
| 35-1 | *6 | General Inorganic Chemistry |
| 35-2 | 2 | Qualitative Analysis |
| 35-3 | 2 | Qualitative Analysis, Advanced |
| 35-4 | *6 | Quantitative Analysis |
| 35-5 | *6 | Quantitative Analysis, Technical |
| 35-7 | 2 | Fire Assay |
| 35-8 | 2 | Metallurgy of Iron and Steel |
| 35-9 | 1 | Technical Gas Analysis |
| 35-10 | ‖8 | Organic Chemistry |
| 35-11 | *6 | Theoretical Chemistry |
| 35-17 | *6 | Applied Chemistry |
| 35-18 | *6 | Chemistry of Road-building Materials |
| 35-99 | 3-5 | Chemical Engineering Thesis |

| No. | Term Hours | Subject |
|---|---|---|
| | | **41 CIVIL ENGINEERING** |
| 41-3 | †3 | Surveying |
| 41-12 | 3 | Railroad Surveying |
| 41-13 | 3 | Railroad Engineering |
| 41-14 | 3 | Railroad Engineering |
| 41-17 | 3 | Railroad Engineering Economics |
| 41-21 | 2 | Highways and Cements |
| 41-31 | 2 | Geodesy |
| 41-40 | 3 | Hydraulics |
| 41-41 | 2 | Hydraulics |
| 41-43 | 2 | Hydraulic Measurements |
| 41-46 | 3 | Water Supplies |
| 41-47 | 3 | Water Power Engineering |
| 41-48 | 3 | Sewerage |
| 41-51 | 2 | Fire Protection Engineering |
| 41-63 | 3 | Contracts |
| 41-95 | 2 | Civil Engineering Topics |
| 41-99 | 3-5 | Civil Engineering Thesis |
| | | **45 APPLIED MECHANICS** |
| 45-1 | 3 | Applied Mechanics |
| 45-2 | 3 | Applied Mechanics |
| 45-3 | 3 | Structural Mechanics |
| 45-12 | 1 | Applied Mechanics Laboratory |
| 45-21 | 3 | Mechanics |
| | | **47 STRUCTURAL ENGINEERING** |
| 47-1 | 3 | Roofs and Bridges |
| 47-2 | 3 | Theory of Structures |
| 47-3 | 3 | Structural Design, Elementary |
| 47-7 | 3 | Bridge Design |
| 47-8 | 2 | Structural Design, Advanced |
| 47-95 | 2 | Structural Topics and Reports |
| 47-99 | 3-5 | Structural Engineering Thesis |
| | | **51 MECHANICAL ENGINEERING** |
| 51-1 | 3 | Steam Engine |
| 51-3 | 3 | Thermodynamics |
| 51-7 | 3 | Engine Design |
| 51-8 | 3 | Power Plant Design |
| 51-15 | 3 | Dynamics of Machinery |
| 51-17 | 3 | Machine Design |
| 51-19 | 3 | Production Engineering |
| 51-21 | 2 | Mechanical Engineering Laboratory |
| 51-26 | 3 | Mechanical Engineering Laboratory |
| 51-28 | 3 | Mechanical Engineering Laboratory |
| 51-95 | 2 | Mechanical Engineering Topics |
| 51-99 | 3 | Mechanical Engineering Thesis |
| | | **54 GEOLOGY** |
| 54-1 | 3 | Physical Geology and Geography |
| 54-21 | 1 | Physical Geography and Meteorology |

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* Two terms; three term hours each.

† Two terms; first term, one term hour; second term, two term hours.

‖ Two terms; four term hours each.

§ Two terms; one and one-half term hours each.

### 54 GEOLOGY (Continued)

| | | |
|---|---|---|
| 54-22 | 2 | Physical Geology |
| 54-23 | 1 | Economic Geology |
| 54-24 | 2 | Historical Geology |

### 61 ELECTRICAL ENGINEERING

| | | |
|---|---|---|
| 61-3 | 3 | Dynamo-Electric Machinery |
| 61-5 | 3 | Alternating Current Machinery |
| 61-8 | 3 | Electrical Laboratory |
| 61-11 | 3 | Alternating Currents |
| 61-12 | 3 | Dynamo Laboratory |
| 61-14 | *6 | Electricity |
| 61-15 | 4 | Electrical Engineering |
| 61-16 | 3 | Electrical Engineering |
| 61-17 | 3 | Telephone and Telegraph |
| 61-23 | 3 | Dynamo Design. |
| 61-96 | 2 | Electrical Topics |
| 61-99 | 3-5 | Electrical Engineering Thesis |

### 64 MINERALOGY

| | | |
|---|---|---|
| 64-1 | 3 | Mineralogy and Lithology |
| 64-2 | 3 | Crystallography and Descriptive Mineralogy |

### 81 POLITICAL ECONOMY

| | | |
|---|---|---|
| 81-2 | *6 | Elements of Economics |
| 81-5 | 3 | Engineering Economtcs |

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* Two terms; three term hours each.

# Examination Group System

The courses are divided into six groups. Each of these groups has assigned to it three periods of four days each for each half year, during which periods all announced examinations in the courses of that group are given. These examinations are limited to the time assigned to these subjects on the program.

Composition of groups and periods allotted to each are as follows:

### FIRST HALF-YEAR

| Subject | Group | Subject | Group | Subject | Group | Subject | Group |
|---|---|---|---|---|---|---|---|
| 11-1 | 5 | 31-2 | 6 | 41-14 | 5 | 51-15 | 1 |
| 11-5 | 3 | 31-7 | 3 | 41-31 | 4 | 51-17 | 3 |
| 11-9 | | 35-1 | 1 | 41-40 | 5 | 51-26 | 5 |
| 11-13 | 5 | 35-2 | 4 | 41-46 | 6 | 51-95 | 3 |
| 13-1 | 6 | 35-4 | 1 | 41-47 | 2 | 61-3 | 5 |
| 13-2 | 6 | 35-5 | 1 | 41-95 | 3 | 61-11 | 6 |
| 13-3 | 3 | 35-9 | 4 | 45-1 | 1 | 61-12 | 5 |
| 15-2 | 6 | 35-10 | 5 | 45-3 | 1 | 61-14 | 6 |
| 15-3 | 3 | 35-11 | 5 | 45-12 | 3 | 61-15 | 3 |
| 17-1 | 4 | 35-17 | 3 | 47-1 | 3 | 61-17 | 2 |
| 21-1 | 4 | 35-18 | | 47-1 | 4 | 61-23 | 4 |
| 21-8 | 4 | 41-3 | 5 | 47-95 | 3 | 81-2 | 6 |
| 25-8 | 4 | 41-12 | 6 | 51-1 | 2 | | |
| 29-1 | 1 | | | 51-7 | 6 | | |
| 29-2 | 2 | | | | | | |
| 29-4 | 2 | | | | | | |

| | | | |
|---|---|---|---|
| Group 1. | Oct. 16, 17, 19, 20. | Nov. 13, 14, 16, 17. | Dec. 18, 19, Jan. 4, 5 |
| " 2. | Oct. 21, 22, 23, 24. | Nov. 18, 19, 20, 21. | Jan. 6, 7, 8, 9. |
| " 3. | Oct. 26, 27, 28, 29. | Nov. 30. Dec. 1, 2, 3. | Jan. 11, 12, 13, 14. |
| " 4. | Oct. 30, 31. Nov. 2, 3. | Dec. 4, 5, 7, 8. | Jan. 15, 16, 18, 19. |
| " 5. | Nov. 4, 5, 6, 7. | Dec. 9, 10, 11, 12. | Jan. 20, 21, 22, 23. |
| " 6. | Nov. 9, 10, 11, 12. | Dec. 14, 15, 16, 17. | Jan. 25, 26, 27, 28. |

Final Examinations January 29, 30, February 1, 2, 3.

## SECOND HALF-YEAR

| Subject | Group | Subject | Group | Subject | Group | Subject | Group |
|---|---|---|---|---|---|---|---|
| 11-2 | 5 | 31-7 | 3 | 41-21 | 3 | 51-8 | 6 |
| 11-4 | 5 | 35-1 | 1 | 41-41 | 5 | 51-19 | 4 |
| 11-6 | 3 | 35-3 | 6 | 41-43 | 5 | 51-21 | 3 |
| 11-8 | 3 | 35-4 | 1 | 41-48 | 4 | 51-28 | 5 |
| 13-1 | 6 | 35-5 | 1 | 41-51 | 2 | 61-5 | 2 |
| 13-2 | 6 | 35-7 | 6 | 41-63 | 1 | 61-8 | 4 |
| 15-2 | 6 | 35-8 | 4 | 45-2 | 1 | 61-10 | 2 |
| 17-1 | 4 | 35-10 | 5 | 45-21 | 4 | 61-16 | 4 |
| 21-5 | 4 | 35-11 | 5 | 47-1 | 6 | 61-22 | 7 |
| 21-13 | 6 | 35-17 | 3 | 47-2 | 6 | 61-95 | 3 |
| 25-1 | 3 | 41-3 | 5 | 47-3 | 2 | 81-2 | 6 |
| 29-3 | 2 | 41-13 | 4 | 47-8 | 3 | | |
| 29-5 | 2 | 41-17 | 5 | 51-3 | 4 | | |
| 31-1 | 1 | | | | | | |

| | | | |
|---|---|---|---|
| Group 1. | Feb. 24, 25, 26, 27. | Mar. 24, 25, 26, 27. | Apr. 30. May 1, 3, 4. |
| " 2. | Mar. 1, 2, 3, 4. | Mar. 29, 30, 31. Apr. 1. | May 5, 6, 7, 8. |
| " 3. | Mar. 5, 6, 8, 9. | Apr. 2, 3, 5, 6. | May 10, 11, 12, 13. |
| " 4. | Mar. 10, 11, 12, 13. | Apr. 7, 8, 9, 10. | May 14, 15, 17, 18. |
| " 5. | Mar. 15, 16, 17, 18. | Apr. 12, 13, 23, 24. | May 19, 20, 21, 22. |
| " 6. | Mar. 19, 20, 22, 23. | Apr. 26, 27, 28, 29. | May 24, 25, 26, 27. |

Final examinations, June 5, 7, 8, 9, 10.

# Departments of Instruction

## ENGLISH and MODERN LANGUAGES

The instruction in the department of English and Modern Languages is arranged, first, to give the student a working knowledge of his native tongue and of at least one foreign language; second, to deepen his appreciation of literature. The various subjects are closely coördinated, the purpose of all being the development of the student's power of thinking and the broadening of his outlook.

**English Subjects are Open for Election as Follows:**

| | *First Term* | *Second Term* |
|---|---|---|
| Sophomore year | 11-13 11-5 | 11-4 11-6 11-8 |
| Junior year | 11-13 11-5<br>11-9 (must be preceded by 11-8) | 11-4 11-6 11-8<br>11-9 (must be preceded by 11-8) |
| Senior year | 11-13 11-5 11-9 | 11-4 11-6 11-8 11-9 |

**11-1 English.** A study of the elemental forms of literary and scientific writing: description, exposition, directions, criticism, argument, and narration, with the ultimate aim of helping the student to think for himself. Reading of illustrative literature. *Four periods a week: one lecture, two recitations, and one ten-minute conference.*

*First term. Three term hours.*

ASSISTANT PROFESSOR SEAVEY, PROFESSOR EARLE, and —— ——

**11-2 English.** A study of actual problems in expression. Reading in general science and literature under the guidance of weekly lectures. *Four periods a week: one lecture, two recitations, and one ten-minute conference. Preparation, 11-1.*

*Second term. Three term hours.*

ASSISTANT PROFESSOR SEAVEY, PROFESSOR EARLE, and —— ——

***11-4 English.** An advanced subject in general composition, including the writing of daily and fortnightly themes. *Three periods a week: two recitations, and one ten-minute conference. Preparation, 11-2 or 12-2.*

*Second term. Two term hours.* PROFESSOR EARLE

**11-5 English.** A brief survey of English literature and history, from the beginnings to about 1750, aiming to broaden the student's appreciation of what he may get from books, and to suggest ways in which the past throws light on the problems of the present. *Four periods a week: three lectures and one ten-minute conference. Preparation, 11-2.*

*First term. Three term hours.* ASSISTANT PROFESSOR SEAVEY

**11-6 English.** A study of some of the most important literary and scientific developments of the nineteenth century. *Four periods a week: three lectures and one ten-minute conference. Preparation, 11-2.*

*Second term. Two term hours.* ASSISTANT PROFESSOR SEAVEY

[11-7 **English.** Advanced English literature. A study of some author, period, or type. The definite work to be carried on will be outlined by the instructor in charge each June for the following term. *Three periods a week: two recitations and one thirty-minute conference. Preparation, 11-6.*

*First term. Two term hours.*]

**11-8 English.** A detailed study of the most important problems of technical writing. *Three periods a week: two recitations and one ten-minute conference. Preparation, 11-2.*

*Second term. Two term hours.*

PROFESSOR EARLE and ASSISTANT PROFESSOR SEAVEY

**11-9 English.** An advanced subject in technical composition. No class meetings; each student writes papers from ten to fifty pages in length under the individual direction of the instructor. The subjects are taken, as far as possible, from technical work previously done by the student outside of college, or from special research. *One thirty-minute conference a week. Preparation, 11-8.*

*First term; repeated in second term. Two term hours.*

PROFESSOR EARLE and ASSISTANT PROFESSOR SEAVEY

*__11-13 English.__ Argumentative composition adapted to meet the special needs of engineers. *Three periods a week: two recitations and one ten-minute conference. Preparation, 11-2 or 12-2.*

*First term. Three term hours.* PROFESSOR EARLE

**13-1 French.** Elementary course. The essentials of grammar, with composition. Reading of short works of modern authors in prose and verse. Open to Freshmen whose entrance language is Latin, Greek, or Advanced German. It must be followed by 13-2 in the Sophomore year. *First term, five recitations a week; second term, four recitations a week.*

*First and second terms. Six term hours.* MR. HILL

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*Open to students in the School of Liberal Arts as well as to students in the Engineering School.

13-2 **French.** Review of grammatical principles especially with reference to syntax. Reading of modern works, including one work related to the technical and scientific studies of the Freshman year. Outside reading; vocabulary practice; dictation and composition. *Three recitations a week. Preparation, elementary entrance credit in French, or 13-1.*
*First and second terms. Six term hours.* MR. HILL

13-3 **French.** Selected works of the nineteenth century; scientific reading; composition; conversation. *Three recitations a week. Preparation, advanced entrance credit in French, or 13-2.*
*First term. Three term hours.* MR. HILL

15-2 **German.** Review of grammatical principles, especially with reference to syntax. Reading of modern works, including one work related to the technical and scientific studies of the Freshman year. Outside reading; vocabulary practice; dictation and composition. *Three recitations a week. Preparation 22-1 or Elementary German for admission.*
*First and second terms. Six term hours.* MR. HILL

15-3 **German.** The rapid reading of modern technical prose in contemporary authors. *Three recitations a week. Preparation, 15-2, or Advanced German for admission.*
*First term. Three term hours.* MR. HILL

17-1 **Spanish.** Elementary course. The essentials of grammar; reading of modern prose; practice in writing Spanish. Open to those who have received a grade of C or higher in French 13-2, 13-3 or 13-4. All others wishing to elect the subject should consult the instructor. *Three recitations a week.*
*First and second terms. Six term hours.* ——— ———

## 21 DRAWING

The department of Drawing aims to give a broad and exact training in the language of graphics; to teach the principles of its construction, its technique, and the art of expression by this medium. It is designed to give the student such practice as shall enable him to use this language with fluency whenever and wherever it may serve better than a written or spoken language. The work of the department also includes practice in the use of graphics for the solution of problems relating to the theory of mechanism and its application to machine design.

**21-1 Drawing.** The course in Freshman Drawing comprises exercises in the proper use and care of drafting tools; numerous problems in geometrical construction; a thorough study of the principles of orthographic projection, freehand and mechanical perspective, and isometric drawing. Considerable time is devoted to the freehand sketching of simple parts of machinery and the careful completion of drawings from these sketches. Throughout the course special attention is given to lettering and the composition of titles. *First term, three periods a week of three hours each, and two periods a week of two hours each.*

*First term. Five term hours.*

ASSISTANT PROFESSORS ASHLEY and CARROLL

**21-5 Descriptive Geometry.** A course comprising the study of principles and their applications, by the solution of a large number of graded problems in which theory and practice are correlated. *Three periods a week; two hours each.*

*Second term. Three term hours.*

ASSISTANT PROFESSORS CARROLL and ASHLEY

**21-8 Drawing.** A study of the technique of graphic expression and its application in giving complete and accurate information to the constructor. Detailed and assembly drawings are made from freehand sketches and other data, but nothing in the nature of a copy is permitted. The work is conducted according to the methods of progressive draftsmen, the greatest emphasis being laid on completeness and accuracy in the use of graphic language. *Three periods a week; two hours each. Preparation, 21-1.*

*First term. Three term hours.*

ASSISTANT PROFESSOR CARROLL and MR. MACNAUGHTON

**21-13 Mechanism.** An introductory course, conducted mainly by graphical methods, and dealing with the fundamental laws governing the velocity ratio and paths of mechanical movements and their application to velocity diagrams, simple types of gearing, and other modes of transmission. *Three periods a week; two hours each. Preparation, 21-1.*

*Second term. Three term hours.*

ASSISTANT PROFESSORS ASHLEY and CARROLL

## 25 MECHANIC ARTS

Work in the shops is designed to give a practical knowledge of mechanical processes and of the materials of construction. By means of lectures, practical illustrations, actual work in the shops and visits to manufacturing plants the student comes in contact with the most approved methods and processes in engineering practice. In the shops a series of graded exercises is given, having in view the formation of habits of precision and the development of judgment essential to the engineer.

During the Senior year the knowledge of shop methods already gained is put to actual test in the development of Shop Problems which are carried on under "Production Engineering." The student investigates shop conditions in certain plants as to economical and practical methods of production. It is intended that work in the shop shall always maintain a close relation with the courses in drawing and design, much of the work in design being carried to completion in the shop, from drawings prepared in the drafting-room.

25-1 **Pattern Making.** Practice is given in the use of bench woodworking tools and the wood-turning lathe for the construction of simple patterns from working drawings. A set of graded exercises leads from simple to the more complicated patterns and core boxes. The methods and principles of foundry practice are introduced in the early part of the course. Much time is spent in the study of working drawings to develop the student's ability to apply the best pattern making and foundry practice, and to understand their relation to shop and drafting room. Visits are made to the shops of large manufacturing plants. *Three periods per week; three hours each.*
*Second term. Three term hours.* MR. ADAMS

25-8 **Metal Work.** This course is introduced by work at the forge in bending, drawing, upsetting, welding, tool-dressing, etc., followed by work at the vise in chipping, filing, and fitting. Lathe work, including straight and taper turning, chucking, boring, reaming, and thread cutting; also drilling, planing, shaper and milling-machine work. *Three periods per week; three hours each.*
*First term. Three term hours.* MR. ADAMS

## 29 MATHEMATICS

The instruction in mathematics is arranged so that fundamental principles of trigonometry, analytics, and calculus may come as early as possible in the course, the more advanced parts of each subject being introduced later. A review of algebra runs through both years in appropriate connection with topics in the other subjects. The prescribed work continues to the end of the Sophomore year, double time being given to mathematics in the first term of the Freshman year. Seniors and Juniors may elect higher courses in the School of Liberal Arts.

29-1 **Computation.** Right and oblique plane triangles, and spherical right triangles. Trigonometric equations and identities. Arrangement of computations, rounding-off processes, use of logarithms and slide rules. *Three periods a week; two hours each. Simultaneous with 29-2.*

*First term. Three term hours.*

PROFESSOR RANSOM and MR. BURDEN

29-2 **Analytical Geometry and Algebra.** Co-ordinate systems, straight lines, circles and conic sections. Simultaneous equations, quadratics, variation. Problems involving tangents, loci, parameters. *Three hours a week. Simultaneous with 29-1.*

*First term. Three term hours.*

PROFESSOR RANSOM and ASSISTANT PROFESSOR DILLINGHAM

29-3 **Freshman Calculus.** Fundamental principles. Algebraic differentials and integrals. Differential and integral rate problems. Maxima and minima. Transcendental functions. Areas. *Three hours a week. Preparation, 29-1 and 29-2.*

*Second term. Three term hours.*

PROFESSOR RANSOM and ASSISTANT PROFESSOR DILLINGHAM

29-4 **Sophomore Calculus.** Review of differentiation and integration. Summation problems. Use of tables. Centroids, moments and averages. Three dimensional analysis. *Three hours a week. Preparation, 29-3.*

*First term. Three term hours.*

ASSISTANT PROFESSOR DILLINGHAM

29-5 **Sophomore Calculus.** Approximate integration. Multiple integrals. Taylor's Theorem, and errors. Elements of Differential Equations. *Three hours a week. Preparation, 29-4.*

*Second term. Three term hours.*

PROFESSOR RANSOM and ASSISTANT PROFESSOR DILLINGHAM

## 31 PHYSICS

The instruction in General Physics extends through the second term of the first year and the first term of the second year, and is common to all Courses in the Engineering School. It is the purpose of the course to lay a thorough foundation for the subsequent study of theoretical, experimental and technical Physics. The fundamental principles of the subject are developed in a course of illustrated lectures and recitations. Considerable attention is paid to the application of these principles to the solution of problems.

At the beginning of the second year the student enters the Physical Laboratory, where the work performed is, from the beginning, exclusively quantitative. It is designed to teach the student to make accurate measurements, to impart training in the manipulation of instruments employed in physical investigation, and to give practice in properly recording and interpreting experimental data. At the same time it leads to a better understanding of the principles of Physics, with which the student has already become acquainted in the lecture and recitation room.

31-1 **Mechanics, Sound, and Heat.** The subjects considered are composition of forces, static and kinetic equilibrium, the laws of motion, the energy principle, the simple types of motion including uniform and uniformly accelerated motion, rotation about a fixed axis, simple harmonic motion, and wave motion and resonance; in heat, thermometry, expansion, calorimetry, change of state, transfer, sources, uses, and the laws of thermodynamics. *One lecture and two recitations per week. Preparation, 29-1 and 29-2.*
*Second term. Three term hours.*
ASSISTANT PROFESSOR MARVIN, MR. POTE, and MR. KNIGHT

31-2 **Optics and Electricity.** The subject of heat is carried over from the previous semester. Following this, the subjects considered are: Optics, sources of light, photometry, velocity, reflection, refraction, optical instruments, dispersion, color, interference, diffraction, polarization; in electricity, electrostatics, the condenser, the electric current, Ohm's law and applications, power, magnetism, the magnetic circuit, electromagnetic induction, the principles of direct and alternating current machines and instruments. *One lecture and two recitations per week. Preparation, 29-3, 31-1.*
*First term. Three term hours.*
ASSISTANT PROFESSOR MARVIN, MR. POTE, and MR. KNIGHT

31-7. **Physical Laboratory.** The earlier experiments relate to the mechanics of solids, liquids and gases. These are followed by experiments in heat including thermometry, vapor pressure, expansion, calorimetry, and mechanical equivalent. The experiments in optics include photometry, refraction, elementary spectrum analysis, and optical instruments. The experiments in electricity include the measurement of resistance, current, electromotive force, and capacity. The use of various instruments of precision, and of graphical methods of interpreting data, is taught, so far as may be, in connection with these experiments. *One period of three hours, with one and one-half hours preparation, weekly. Preparation, 31-1; 31-2 simultaneously.*
*First and second terms. Three term hours.*
ASSISTANT PROFESSOR MARVIN, MR. POTE, and MR. KNIGHT

## 35 CHEMISTRY

**35-1 General Inorganic Chemistry.** An introductory course in theoretical and descriptive inorganic chemistry, with a thorough consideration of the simplest carbon compounds and principal technical processes. *Three periods a week, two lectures, one three hour laboratory period with conferences. First and second terms. Six term hours.*

PROFESSOR DURKEE, ASSISTANT PROFESSOR COBB, MR. BAKER and ASSISTANTS

**35-2 Qualitative Analysis** for the detection of the metals, a course which includes the experimental development of schemes for the division of the metals into groups, the separation and detection of the metals in each group, — a study of all the chemical changes and analytical details, together with the correct analysis of six known solutions and thirteen unknown. *Two periods a week; three hours each; laboratory work and conference. Six lectures.*

*First term. Two term hours.* PROFESSOR DURKEE, and ASSISTANTS

**35-3 Qualitative Analysis, Advanced,** dealing with methods to effect solution of solids, the detection of mineral and common organic acids, the complete analysis of inorganic solids, including mixtures of salts, minerals, alloys, and slags. Three known and thirteen unknown are required, and thorough study of the chemical changes and conditions involved in the analyses. *Two periods a week; three hours each; laboratory work and conference.*

*Second term. Two term hours.* MR. BAKER

**35-4 Quantitative Analysis.** Theory and practice of gravimetric and volumetric analysis, including the determination of chlorine by the ordinary and Gooch crucible methods, iron and sulphur in ferrous ammonium sulphate, silica in a silicate, phosphorus in a phosphate, complete analysis of dolomite, and brass, preparation of strictly half-normal sodium hydroxide and hydrochloric acid solutions, the volumetric analyses of soda ash and oxalic acid, the analysis of iron ore by the dichromate and permanganate methods, determination of chromium in chromite, of antimony by the iodine method, and silver by the sulphocyanate method. *Three periods a week; three hours each; laboratory work and conference.*

*First and second terms. Six term hours.* PROFESSOR DURKEE

**35-5 Quantitative Analysis.** Technical. Work varied somewhat to meet the needs of individual students. Course ordinarily comprises proximate analysis of coal, nitrogen in coal, by Kjeldahl's method, complete analysis of boiler scale, mineral and sanitary analysis of water, determination of copper in ores by iodine and cyanide methods, of zinc by ferro-cyanide method, complete analysis of Babbitt metal, determination of lead in ores and manganese, sulphur, phosphorus, silicon and carbon in iron and steel. *Three periods a week ; three hours each ; laboratory work and conference.*

*First and second terms. Six term hours.* PROFESSOR DURKEE

35-7 **Fire Assay.** A course which deals with the theory and practice of sampling and assaying gold and silver ores. *Two periods a week; three hours each ; laboratory work and conference.*

*Second term. Two term hours.* PROFESSOR DURKEE

35-8 **Metallurgy of Iron and Steel.** Considered largely from the chemical side, and includes the study of ores, fluxes, fuels, furnaces, and the other mechanical devices used in the commercial production of pig iron, wrought iron, and steel, together with the solution theory of iron and steel, heat treatment of steel, and production of malleable cast iron. *Two periods a week ; one hour each ; lectures and recitations.*

*Second term. Two term hours.* MR. BAKER

35-9 **Technical Gas Analysis,** by the Orsat, Elliot, and Hempel systems. *One period a week, of three hours.*

*First term. One term hour.* PROFESSOR DURKEE and ASSISTANT

35-10 **Organic Chemistry.** This course consists of lectures, recitations, and laboratory work. It is intended to familiarize the student with the typical compounds of carbon and their more important derivatives. The work in the laboratory includes the preparation of certain of the more important substances referred to in the lectures, and the identification of certain classes of compounds. *Four periods a week ; three lectures ; one three-hour laboratory period.*

*First and second terms. Eight term hours.*
ASSISTANT PROFESSOR COBB

35-11 **Theoretical Chemistry.** The subject matter of this course consists largely of the principles usually included under the head of Physical Chemistry. The work in the laboratory consists of physical chemical measurements and experiments of a physical chemical nature. *Three periods a week, two lectures, one three-hour laboratory period.*

*First and second terms. Six term hours.* ASSISTANT PROFESSOR COBB

35-17 **Applied Chemistry.** A course dealing with the most important applications of inorganic and organic chemistry to manufacturing purposes, such as the production of sulphuric acid, soda, illuminating gas, and sugar. *Three periods a week. Two lectures or recitations, and one three-hour laboratory period.*

*First and second terms. Six term hours.* PROFESSOR DURKEE

**35-18 Chemistry of Road-building Materials.** The origin, production, refining, and chemical analysis of tars, asphalts, petroleum and coal tar oils, Portland and other cements. The course is designed for advanced students in highway engineering, and should fit them for efficient service in cement laboratories and cement plants, and for testing the bituminous materials now so widely applied to road surfaces. *Three periods a week; three hours each; lboratory work and conference. Preparation, 41-21, 35-1, and 35-2.*

*First and second term. Six term hours.* PROFESSOR DURKEE

**35-99 Chemical Engineering Thesis.** The development of a Chemical Engineering problem by extended personal research. The head of the department has authority to substitute another engineering subject for the thesis.

*Second term. Three to five term hours.*

PROFESSOR DURKEE and ASSISTANT PROFESSOR COBB

## 41 CIVIL ENGINEERING

**41-3 Surveying.** In this course each student obtains field practice with transit, level and plane table; also, an office drill in plotting and in surveying computations. The problems that are selected for both field and office are intended to illustrate general surveying principles and are considered to be well adapted to the needs of engineers in all courses. They include surveying problems that are incident to building construction and the installation of machinery, as well as problems that occur in ordinary surveys for topography and for area. Text-books; Tracy's Plane Surveying, and Topographical Drawing, by Daniels. *One three-hour period a week, first term; two three-hour periods a week, second term. Preparation, 29-1.*

*First and second terms. Total, three term hours.* MR. BURDEN

An equivalent for this course may be taken during the summer.

**41-12 Railroad Surveying.** The greater part of the problems selected for this course are based on information secured by the student while engaged in the reconnoissance and preliminary survey of a short line of proposed railroad near the College. These proplems consist of the more important ones that daily arise in the practice of the railroad engineer, and they comprise the determination and location of all simple and compound curves that might be required for the final location of the line; the accurate plotting of the survey notes by means of a system of co-ordinates; the computations arising in the various solutions with a strict insistance upon neat and accurate note-keeping; a preliminary estimate of the materials of construction required; the completion of all drawings, and a final report as to the advisability of building the line. Text books: Field Engineering, by Searles. *Three periods a week; three hours each. Preparation, 41-3.*

*First term. Three term hours.* ASSISTANT PROFESSOR CONNER

41-13 **Railroad Engineering.** A thorough analysis, both theoretical and practical, of the transition spiral; the study of earthwork computations, use of the mass diagram, determining cost of overhaul, use and computation of the vertical curve, proper methods of attack in steam-shovel work, the design and estimate of trestle construction, of culverts and waterways, and a general treatment of methods employed in locating all structures of standard design that support the roadbed. A brief study is made of the analysis of labor costs, and of the general principles underlying the scientific management of materials and men. Textbooks: The Railway Transition Spiral, by Talbot; Railroad Construction by Crandall and Barnes. *Three periods a week; one hour each. Preparation, 41-12.*
*Second term. Three term hours.* ASSISTANT PROFESSOR CONNER

41-14 **Railroad Engineering.** A recitation course comprising the study of tunnel design, roadbed construction, track materials and track work, frogs and switches, yard and terminal layouts, siding design and construction, signaling and interlocking, equipment and tools, and the general principles of railroad maintenance. Problems are given in the elementary economic principles involved in railroad upkeep, the treatment of ties, and the capitalized comparison of structures. The student may be required to develop a proposed siding both for the design and the actual staking. Textbooks: Railroad Construction, by Crandall and Barnes, and The American Civil Engineers' Pocketbook. *Three periods a week; one hour each. Preparation, 41-13. First term. Three term hours.*
ASSISTANT PROFESSOR CONNER

41-17 **Railroad Engineering Economics.** Lectures and recitations on the economic principles underlying the proper management of all engineering business associated with the location, development, management, and operation of a railroad. A general outline of the procedure in financing railroad ventures is given with the attendant principles involved in bonding and under writing such projects, and their application is fully demonstrated by the solution of typical problems. Text book: Economics of Railroad Construction, by Webb. *Three periods a week; one hour each. Preparation, 41-14.*
*Second term. Three term hours.* ASSISTANT PROFESSOR CONNER

41-21 **Highways and Cements.** Lectures and recitations on the history of roads and pavements; subdrainage and surface drainage; foundations; earth and broken stone roads; brick, wood and stone block pavements; asphaltic and concrete pavements; use of dust palliatives; cleaning and sanitation of streets; sewer, gas, water and other pipe systems; machinery used in road construction.

Laboratory work consists of the mechanical analysis of sand and the proportioning of concrete by sieve analysis; determination of silt in sand; testing Portland cement by standard specifications; road-building properties of asphaltic oils, and bituminous materials; tests of wearing and cementing qualities of rocks and abrasion test of paving brick.

Office and field work comprise the preparation of plan and cross sections from survey notes of an existing unimproved road; location of a highway from contour plan; actual survey, design and mapping of streets including determination of proper grades at street intersections; inspection of roads. Text book: American Civil Engineers' Pocketbook. *One recitation and one three-hour laboratory period per week.*

*First term; repeated in second term. Two term hours.* MR. BURDEN

41-31 **Geodesy.** The determination of a true meridian by star and solar observations, accurate measurement of a base line, of angles in a triangulation system, and the adjustment of observations by the method of least squares. Text book; Geodetic Surveying, by Ingram *Two periods a week; three hours each. Preparation, 41-3.*

*First term. Two term hours.* ASSISTANT PROFESSOR CONNER

41-40 **Hydraulics.** Theoretical and Applied, including the laws that relate to the pressure and flow of water in pipes, the discharge through weirs, tubes, and canals, together with a treatment of the elementary principles of water turbines. Tests of 100 horsepower turbine, 36-inch Venturi Meter, 40-inch riveted pipe, and 10-foot weir. Text book: A Treatise on Hydraulics, by Merriman. *Three periods a week; one hour each.*

*First term. Three term hours.* PROFESSOR SANBORN

41-41. **Hydraulics.** A course similar to 41-40 differing from it only in length. Specially planned for students in Mechanical and Electrical Engineering. *Two periods a week; one hour each.*

*Second term. Two term hours.* PROFESSOR SANBORN

41-43 **Hydraulic Measurements.** Experiments on contracted and submerged weirs, standard nozzles, proportional water meter, impulse water wheel, duplex pump, and centrifugal pump; river and canal gaugings by rod floats, and current meter. Text book: A treatise on Hydraulics, by Merriman. *Two periods a week; three hours each. Preparation, 41-40 or 41-41.*

*Second term. Two term hours.* PROFESSOR SANBORN

41-46 **Water Supplies.** The examination of water supplies, quality of water, communicable diseases, purification of water, water supplies, reservoirs, dams, pumping machinery. Textbook; American Civil Engineers' Pocketbook. *Three periods a week; one hour each. Preparation, 41-40.*

*First term. Three term hours.* PROFESSOR SANBORN

41-47 **Water Power Engineering.** Water shed areas, stream flow, hydraulics of water wheels and turbines, turbine testing, selection of turbine for given conditions, water-power development and value of privileges. Text book: Water Power Engineering, by Mead. *Three periods a week; one hour each. Preparation, 41-40.*

*First term. Three term hours.* PROFESSOR SANBORN

41-48 **Sewerage.** Purification of sewage, the design of a sewerage system, forms of construction, modern methods of sewage and garbage disposal. Text-book: American Civil Engineers' Pocketbook. *Three periods a week; two hours each. Preparation, 41-46.*

*Second term. Three term hours.* PROFESSOR SANBORN

41-51 **Fire Protection Engineering.** Fire streams, fire pumps, meters, pipe systems, including automatic sprinklers, watchman service, public fire departments, fire causes, and fire proof and slow burning construction. Recitation and design from field practice. *Two periods a week; two hours each. Preparation, 41-40.*

*Second term. Two term hours.* PROFESSOR SANBORN

41-63 **Contracts.** The essential elements of all contracts, their formation and modes of discharge, the fundamental principles of successful writing and interpretation of contracts for the erection of engineering works, are carefully considered. Commercial contracts are also studied, including contracts of association, of sale, of transportation, and instruments of credit. The duties and legal responsibilities of the engineer as agent, business man, or independent contractor are emphasized, and some practice is had in writing engineering contracts and specifications. Text book: Contracts in Engineering by Tucker. *Three periods a week; one hour each.*

*Second term. Three term hours.* ASSISTANT PROFESSOR CONNER

41-95 **Civil Engineering Topics.** Presentation and discussion of engineering topics. Text book: Proceedings of the American Society for Civil Engineers for the present year. *Two periods a week; one hour each. Preparation, Junior Civil Engineering courses.*

*First term. Two term hours.* PROFESSOR SANBORN

41-99 **Civil Engineering Thesis.** A special investigation by research, design, or experimentation. The head of the department has authority to substitute another engineering subject for the thesis.

*Second term. Three to five term hours.*

PROFESSOR SANBORN and ASSISTANT PROFESSOR CONNER

## 45 APPLIED MECHANICS

45-1 **Applied Mechanics.** This is a consideration of the principles of the strength of materials, relating to beams, columns and shafts. In the development, the following subjects are treated in detail: centre of gravity; moment of inertia; the laws of elasticity; coefficients of elasticity; relations between stress and strain; pure stresses, as tension, compression, and shear; elastic limits, working stresses and ultimate resistances of wrought iron, steel, timber, and concrete; reactions and bending moments of beams;

bending moment and shear diagrams; theory of flexure. It includes also the design and construction of steel and timber beams, columns, and shafts. *Three periods a week; recitations and lectures with numerous problems. Preparation, 29-5 and 45-21.*

*First term. Three term hours.*

PROFESSOR ROCKWELL and ASSISTANT PROFESSOR SMITH

45-2 **Applied Mechanics.** This course deals with the stresses in simple framed structures, including an introduction to the methods of graphic statics, and a brief treatment of the principles of mechanics involved in masonry design. *Three periods a week; recitations and lectures with problems. Preparation, 45-1.*

*Second term. Three term hours.*

PROFESSOR ROCKWELL and ASSISTANT PROFESSOR SMITH

45-3 **Structural Mechanics.** A treatment of the mechanics of masonry and reinforced concrete structures, including the design of retaining walls, abutments, masonry arches, chimneys, dams, and foundations. *Three periods a week; recitations and lectures with problems and designs. Preparation, 45-2.*

*First term. Three term hours.* PROFESSOR ROCKWELL

45-12 **Applied Mechanics Laboratory.** This course deals with the resistance of the materials of construction, and comprises the testing of cast iron, steel, wrought iron, timber, and concrete in tension, compression, and shear, and the determination of the elastic limits, ultimate strengths, and coefficients of elasticity of these materials. *One period a week; two hours. Simultaneous with 45-1.*

*First term. One term hour.*

ASSISTANT PROFESSOR SMITH

45-21. **Mechanics.** A course in the fundamental principles of general mechanics with numerous applications to engineering problems. Statics, motion, dynamics, work and energy, and friction. *Three periods a week: Preparation, 31-1.*

*Second Term. Three term hours.*

PROFESSOR ROCKWELL and ASSISTANT PROFESSOR SMITH

## 47 STRUCTURAL ENGINEERING

47-1 **Roofs and Bridges.** A study of the fundamental principles of Structural Engineering. It includes the theory of algebraic and graphical stress analysis for statically determinate structures, including roofs, bridges, towers, etc., and the design of structural members and details. *Three periods a week; lectures and recitations, with problems. Preparation, 45-2.*

*First term. Three term hours*

PROFESSOR ROCKWELL and ASSISTANT PROFESSOR SMITH

47-2 **Theory of Structures.** An advanced course in the theory and design of structures. The method of influence lines is used to a considerable extent in addition to the usual algebraic methods. *Three periods a week; lectures aud recitations, with problems. Preparation, 47-1 and 45-3.*

*Second term. Three term hours.* PROFESSOR ROCKWELL

47-3 **Structural Design.** An introductory course in the design of framed structures. It consists of (*a*) the critical examination of and report on some existing structure and (*b*) the design and detail drawings of a plate girder bridge, and a steel roof truss. *Three periods a week; three hours each. Simultaneous with 45-2.*

*Second term. Three term hours.*

ASSISTANT PROFESSOR SMITH

47-7 **Bridge Design.** A course in the design of riveted and pin connected steel bridges. It consists of (*a*) one complete design of a typical bridge, including a critical study of the important details, carried on under the guidance of the instructor, and then (*b*) each student is given a different set of data from which he is required to make an independent design and general drawing. *Three periods a week; three hours each. Preparation, 47-3. Simultaneous with 47-1.*

*First term. Three term hours.*

ASSISTANT PROFESSOR SMITH

47-8 **Structural Design.** The design of masonry and reinforced concrete structures. *Two periods a week; three hours each. Preparation, 45-3.*

*Second term. Two term hours.*

PROFESSOR ROCKWELL

47-95 **Structural Topics and Reports.** Reports by each student on assigned reading in engineering literature, and on the stability and safety of structures, based on a personal examination by the student. The presentation is by lecture, but a written copy of each report must be left with the department. *Two periods a week; one hour each. Preparation, credit in required work of the Junior year.*

*First term. Two term hours.*

PROFESSOR ROCKWELL and ASSISTANT PROFESSOR SMITH

47-99 **Structural Engineering Thesis.** A single topic is developed by extended research, design, or experimentation.

*Second term. Three to five term hours.*

PROFESSOR ROCKWELL and ASSISTANT PROFESSOR SMITH

## 51 MECHANICAL ENGINEERING

51-1 **Steam Engine.** This course deals with the generation of steam and its use in the steam engine. It comprises a study of modern types of boilers and their auxiliary apparatus, simple and compound

engines, both condensing and non-condensing; a discussion of the elementary principles of thermodynamics and of the use of the indicator in steam engine practice. Some attention is given to the production of gas for power purposes and its use in the gas engine. *Three periods a week; one hour each. Preparation, 21-13 29-3 and 31-1,*
*First term. Three term hours.* PROFESSOR CHASE

51-3 **Engineering Thermodynamics.** This course is devoted to the thermodynamics of the steam engine and other heat engines, and includes a study of the properties of steam, gas and air as used in steam engines, turbines, gas engines, air compressors and blowers; also the working fluids and saturated vapors used in refrigeration. The object of the course is to teach the principles, and their application to practical problems. *Three periods a week; one hour each. Preparation, 29-5 and 51-1.*
*Second term. Three term hours.* PROFESSOR CHASE

51-7 **Engine Design.** The design of the steam turbine, steam engine and gas engine, involving the strength and proportion of parts and including the layout of the valve gear of high speed engines, the Corliss gear and locomotive valve gears. *Three periods a week; two hours each. Preparation, 51-3, and simultaneous with 51-15.*
*First term. Three term hours.* PROFESSOR CHASE

51-8 **Power Plant Design.** A study of steam power plant equipment, including the selection of boilers and engines; pumps, heaters, condensers; arrangement of piping; chimneys, mechanical draft; mechanical stoking, coal handling. Boiler design, including calculations for one type of boiler. *Three periods a week; two hours each.*
*Second term. Three term hours.* PROFESSOR CHASE

51-15 **Dynamics of Machinery.** A graphical and analytical consideration of the transmission of energy in machines and power transmission. The construction of inertia curves and crank effort diagrams applied to the solution of problems relating to fluctuations in speed, flywheels, balancing of moving parts and regulation by governors. *Three periods a week; one hour each. Preparation, 21-13 and 45-2.*
*First term. Three term hours.* PROFESSOR CHASE

51-17 **Machine Design.** An application of the principles of mechanism and mechanics to the solution of definite problems in the design of a representative type of machine. A systematic training of the judgment is an important part of this course. *Three periods a week; three hours each. Preparation, 21-8, 21-13 and 45-2.*
*First term. Three term hours.*
PROFESSOR ANTHONY and MR. MACNAUGHTON

51-19 **Production Engineering.** A study of the efficiency of machine tools, the design and construction of special tools for the manufacture of machinery, the investigation of shop conditions and practice for the economical production of machine parts. *Three periods a week; three hours each. Preparation, 25-8.*

*Second term. Three term hours.*

PROFESSOR ANTHONY and MR. MACNAUGHTON

51-21 **Mechanical Engineering Laboratory.** Efficiency of simple machines; screw threads; hoists, simple, duplex, triplex; transmission of power by belts. The determination of the clearance of engines; valve setting on plain slide valve, riding cutoff, and Corliss engines. Gage testing; the adjustment and use of indicators; testing indicator springs; the use of several types of steam calorimeters; injector test; flow of steam through orifices. The results of all laboratory work are submitted in the form of carefully written reports. *Two periods a week; three hours each. Preparation, 51-1.*

*Second term. Two term hours.* MR. MACNAUGHTON

51-26 **Mechanical Engineering Laboratory.** Steam engines, pumps and auxiliary apparatus. Tests on riding cut-off shaft governor and Corliss engines; a 16 x 8½ x 9 duplex steam pump; measurement of water by weir, nozzle and meter; condenser tests; analysis of flue gases. Internal combustion engines. Tests on a 10 H.P. 4 cycle gas engine, 11 H.P. 2 cylinder, 2 cycle gasolene engine, automobile engines and marine type engines, including instruction and practice in their operation. *Three periods a week; three hours each. Preparation, 51-3 and 51-21.*

*First term. Three term hours.*

PROFESSOR CHASE, MR. ADAMS and MR. MACNAUGHTON

51-28 **Mechanical Engineering Laboratory.** Tests on a horizontal return tubular boiler; determination of the velocity of steam through ports; coefficients of friction with different oils and friction on different types of bearings; test on a 35-inch exhaust fan; tests on a steam turbine and on an air compressor; test at a 2000 K.W. power station, and other tests which may be arranged. *Three periods a week; three hours each. Preparation 51-26.*

*Second term. Three term hours.*

PROFESSOR CHASE and MR. MACNAUGHTON

51-95 **Mechanical Engineering Topics.** A course of lectures by students. Each member of the course chooses three topics from the proceedings of the American Society of Mechanical Engineers. The subjects are presented to the class in the form of lectures, followed by discussion and criticism. *Two periods a week. Preparation, Junior Mechanical Engineering courses.*

*Second term. Two term hours.* PROFESSORS ANTHONY and CHASE

51-99 **Mechanical Engineering Thesis.** An essay based on extended personal research, design, or experimentation. The head of the department has authority to substitute another engineering subject for the thesis.

*Second term. Three to five term hours.*

PROFESSORS ANTHONY AND CHASE

## 54 GEOLOGY

The subjects offered in the department of Geology do not form a sequence, but are intended to give different classes of students that knowledge of geology and mineralogy which they need. In all cases, they aim to include some real grasp upon the structure and history of the earth, the problems presented in the study thereof, and the modes of attack upon those problems. The first subject (Geology 1) is introductory, open to all, and intended primarily for those who have had no previous work in science. The other subjects are such that certain preliminary studies, stated in connection with each, must be taken before entering upon them.

The illustrative collections in these lines are ample. Besides exhibition specimens in the Barnum Museum, there is a working collection illustrating mineralogy, lithology, and dynamical and historical geology. These are supplemented with maps, diagrams, photographs, and lantern slides. The work in each subject consists of lectures and recitations, together with work in the laboratory and in the field. Excursions are taken to neighboring points that illustrate certain phenomena. Tufts College is well placed for field work and for the study of various natural processes.

54-1 **Physical Geology and Geography.** Lectures, recitations, and field work. Mainly for those intending to teach. *Three periods a week; one hour each; and seven half-day excursions.*

*Second term. Three term hours.* PROFESSOR LANE

*54-21 **Physical Geography and Meteorology.**

*First term. One term hour.* PROFESSOR LANE

*54-22 **Physical Geology.**

*First term. Two term hours.* PROFESSOR LANE

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* 54-21 and 54-22 must be taken together, and they or 54-1 must precede 54-24. A knowledge of chemistry and mathematics is presupposed.

54-23. **Economic Geology.**
*Second term. One term hour.* PROFESSOR LANE.

*54-24. **Historical Geology.**
*Second term. Two term hours.* PROFESSOR LANE.

## 61 ELECTRICAL ENGINEERING

The aim of the work in this department is to fit men to deal intelligently with electrical problems likely to be presented to the practical engineer. With this in view, principles rather than details are emphasized, and these principles are developed and fixed by the free use of concrete problems as well as by laboratory experiments and tests.

61-3 **Dynamo Electric Machinery.** An elementary course dealing with the fundamental principles of dynamo electric machinery and their application in the construction and operation of generators and motors. Some attention is also given to storage batteries, arc and incandescent lamps and systems of direct-current distribution. *Three periods a week; one hour each. Preparation, 31-2.*
*First term. Three term hours.*
ASSISTANT PROFESSORS ROLLINS and MUNRO

61-5 **Alternating Current Machinery.** A course treating of the theory, construction, and operation of synchronous machinery. *Three periods a week; one hour each. Preparation, 61-3.*
*Second term. Three term hours.* ASSISTANT PROFESSOR MUNRO

61-8 **Electrical Laboratory.** Electrical measurements and testing, including, in addition to the more common measurements, calibration of instruments, study of arc and incandescent lamps, and direct current dynamos. *Three periods a week; three hours each. Preparation, 61-3.*
*Second term. Three term hours.*
ASSISTANT PROFESSORS ROLLINS and MUNRO

61-11 **Alternating Currents.** The mathematical development of equations and formulas from elementary electrical principles, and the physical interpretation of the equations and formulas thus developed. *Three periods a week; one hour each. Preparation, 31-2, 45-21, and 29-5.*
*First term. Three term hours.* PROFESSOR RANSOM

61-12 **Dynamo Laboratory.** Alternating current testing. *Three periods a week; three hours each. Preparation, 61-5.*
*First term. Three term hours.*
ASSISTANT PROFESSORS ROLLINS AND MUNRO

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* See foot-note on preceding page.

**61-15 Electrical Engineering.** A course dealing with the production, transmission, distribution, and utilization of electrical power. *Three recitations a week, with solution of assigned problems. Preparation, 61-5.*
*First term. Three term hours.* ASSISTANT PROFESSOR ROLLINS

**61-16 Electrical Engineering.** A continuation of 61-15. *Three periods a week; one hour each. Preparation, 61-15.*
*Second term. Three term hours.* ASSISTANT PROFESSOR ROLLINS

**61-17 Telephone and Telegraph.** A course on principles and operation of telephone and telegraph systems. *Three periods a week. Preparation, 31-2 and 61-3.*
*First term. Three term hours.* ASSISTANT PROFESSOR ROLLINS

**61-23 Dynamo Design.** A course dealing with the application of the laws of elsctricity and magnetism to the calculations of electrical apparatus. *Three periods a week; two hours each. Preparation, 61-3 and 61-5.*
*First term. Three term hours.* ASISTANT PROFESSSOR MUNRO

**61-96 Electrical Topics.** Lectures by students on electrical subjects, followed by discussion and criticism. *Three periods a week. Preparation, 61-15.*
*Second term. Two term hours.* ASSISTANT PROFESSOR ROLLINS

**61-99 Thesis.** An essay based on some construction, design, or investigation. The head of the department has authority to substitute another engineering subject for the thesis.
*Second term. Three to five term hours.*
ASSISTANT PROFESSORS ROLLINS and MUNRO

## 64 MINERALOGY

**64-1 Mineralogy and Lithology.** *Two recitations and four hours laboratory work a week. Preparation, 35-1.*
*First term. Three term hours.* PROFESSOR LANE

64-1 Mineralogy alone is of use to civil and structural engineers, but those who are looking to mining or chemical engineering should also take 64-2.

[64-2 **Crystallography and Optical Mineralogy.** *Two lectures and four hours laboratory work a week. Preparation, 64-1.*
*Second term. Three term hours.* PROFESSOR LANE]

## 81 POLITICAL ECONOMY

**81-2 Elements of Economics.** Designed especially for students of engineering; aims at a comprehensive study of the elements of economics, with special reference to present day economic and social problems. Text book (Taussig, Principles of Economics), lectures, tests. *Three recitations a week.*
*First and second terms. Six term hours.* PROFESSOR METCALF

81-5 **Engineering Economics.** The purpose of this course is to acquaint the student with problems involved in the handling of public service and industrial corporations; to make a study of the financial, legal, and operating elements of the problem; to include the investigation of the physical elements for the purpose of accomplishing economic betterments; the study of the principles of commercial capitalization, its functions, together with the profit possibilities; the methods employed in financing engineering projects by bond and stock issues; the elements of appraisals and valuations of business corporations; the study and application of the terms, amortization, depreciation, appreciation, obsolescence with reference to the field of engineering business; the elements of economic organization and management with a study of the underlying scientific principles; the duties of the banker's engineer and of the engineering promoter in the investigation of new projects and reorganization of old ones. The work of the course will be confined principally to mechanical, electrical and chemical engineering problems, for which reason this course is open only to seniors in these departments of the Engineering School. *Three hours a week; lectures, assigned readings, problems and reports.*

*First term, three term hours.* ASSISTANT PROFESSOR CONNER

# Acknowledgment of Gifts

The Engineering School makes grateful acknowledgment of gifts and favors from the following:

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# THE
# BROMFIELD-PEARSON
# SCHOOL

# The Bromfield-Pearson School

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# The Bromfield-Pearson School

The Bromfield-Pearson School is intended to meet the wants of young men whose preparation for an Engineering course may be partially deficient in one or more of the required branches, but whose practice and experience in the applied part of Engineering may qualify them to pursue college work while making up these deficiencies. By this means an engineering education is made possible to those who may have been deprived of the opportunities for obtaining the necessary preparation, or who may have allowed considerable time to elapse between the high school and the college course. A mature mind, industrious habits, and a keen appreciation of the value of the higher education in Engineering are essential qualifications for engaging in this work.

As it is the intention of the Trustees to limit the membership to those earnest and somewhat mature students who cannot afford the time ordinarily required in the fitting school, candidates will not be received from manual training and high schools.

## ADMISSION

Students intending to join the School must obtain from the Dean an application blank, which they are required to fill out and return. On receipt of this statement they will be informed as to the conditions of entrance and the program of studies which it will be possible to pursue.

## REGULATIONS

Students are subject to all the rules governing members of the College.

All preparatory work must be completed during the year, as no student will be admitted to the School for more than one year.

Students admitted to college classes will be required to obtain a somewhat higher per cent. than the minimum requirement for engineering students.

On the satisfactory completion of the preparatory work students will be given a certificate of admission to the College. They will also receive credit for college work which may count toward a degree.

The President and the Dean have final authority concerning admission, promotion, and discipline.

## EXPENSES

The tuition fee is one hundred and fifty dollars a year, payable as follows: seventy-five dollars on or before October 1, and the remainder on or before March 1.

A registration fee of five dollars is charged each entering student, and is payable at the time of registration.

No part of the tuition fee will be refunded to pupils who for any reason withdraw from the School before the close of the term for which the fee is paid.

The cost of table board is from $4.00 to $5.00 per week. Furnished rooms may be had at $1.50 or $2.00 a week. Other expenses vary with the economy of each student. Students living in the college dormitories furnish their own rooms.

The following estimates represent the fixed annual expenses: —

| | | |
|---|---|---|
| Tuition | $150.00 | $150.00 |
| Half-room rent | 20.00 | 91.00 |
| Board, $4.00 to $5.00 a week (36 weeks) | 144.00 | 180.00 |
| Physical training | | 15.00 |
| Books, instruments, and supplies | 15.00 | 25.00 |
| Total | $329.00 | $461.00 |
| Registration-fee, for entering students | | $5.00 |

For other information address GARDNER C. ANTHONY, Dean of the Bromfield-Pearson School, Tufts College, Mass.

# REGISTER OF STUDENTS AND ALUMNI

# Register of Students in the Engineering School

## 1913-14

**[In the following list the course pursued by each student is indicated by the Italic letters immediately following the name. The signs used are as follows: courses leading to the degree of B.S., in Civil Engineering, *ce;* in Structural Engineering, *st e;* in Electrical Engineering, *ee;* in Mechanical Engineering, *me;* in Chemical Engineering, *ch e.* There is no differentiation made in the studies during the first two years.**

**The third column records the home address, which is in Massachusetts unless stated to be elsewhere. The fourth column gives the address at Tufts College, unless the street is printed in Italics, in which case it is a part of the home address.]**

### Senior Class

| | | | |
|---|---|---|---|
| Abbott, Porter Sheldon | *st e* | *Somerville* | Commons Club |
| Avery, Walter Roger | *st e* | *Somerville* | West, 31 |
| Ayer, Perley Fay | *st e* | *Portland, Me.* | Θ Δ X House |
| Bennett, William Joseph | *ee* | *W. Medford* | *59 Grove St.* |
| Carlson, Carl Oscar | *ch e* | *Quincy* | Paige, 13 |
| Eastman, Fred Cecil | *me* | *Swampscott* | Δ T Δ House |
| Ellms, Carlton Warren | | *S. Sudbury* | Δ Υ House |
| Faden, James Leatherbee | *ee* | *Waltham* | Δ Υ House |
| Ford, Frederick William, Jr. | *st e* | *Tufts College* | Α Τ Ω House |
| Foss, Clarence Wardwell | *ee* | *W. Lynn* | Δ T Δ House |
| French, Joseph Allen | *ee* | *Waltham* | Δ Υ House |
| Garabedian, Carl Arshag | *ch e* | *Dorchester Center* | Paige, 30 |
| Gardella, John Louis | *ee* | *Brookline* | *115 Washington St.* |
| Geer, Everett Austin | *ee* | *Three Rivers* | Α Τ Ω House |
| Gurvin, John Edward | *ce* | *Somerville.* | *604 Broadway* |
| Hayward, Alfred Webster | *st e* | *W. Somerville* | Δ Υ House |
| Henderson, William Davis | *ce* | *Tomkinsville, N. Y.* | Δ Υ House |
| Hill, Ralph Weston | *st e* | *Peabody* | Commons Club |
| Hurley, William Joseph | *ce* | *Belmont* | *20 Cross St.* |
| Jackson, Henry Olin | *ce* | *Southbridge* | Δ T Δ House |
| Kearns, William Henry | *ce* | *Waverley* | *88 Beech St.* |
| Kelley, Walter Leonard | *ee* | *Arlington* | *30 Cleveland St.* |
| Kendall, Harrison Shattuck | *st e* | *Waverly* | *146 Mill St.* |
| Kett, Timothy Justin | *ce* | *Fair Haven, Vt.* | West, 24 |
| Marshall, Edward Lester | *st e* | *Lynn* | Θ X Δ House |
| Mastrangelo, Michael Joseph | *st e* | *Chelsea* | East, 11 |
| Miller, Everett Burton | *ee* | *Meriden, Conn.* | Ζ Ψ House |
| Monighan, Joseph Albert | *ce* | *Somerville* | *21 Prichard Ave.* |
| O'Meara, Francis | *ch e* | *Brighton* | *72 Mapleton St.* |
| O'Neill, Carroll Charles | *st e* | *Brookline* | West, 12 |

| | | | |
|---|---|---|---|
| Perkins, Kaler Alfred | *ee* | *E. Saugus* | Σ Τ Α House |
| Power, Harold James | *ee* | *Everett* | Paige, 6 |
| Prentiss, Joseph Adams | *ee* | *Belmont* | *206 Prospect St.* |
| Ramsay, Harold Southwood | *ee* | *Portland, Me.* | West, 31 |
| Rice, Perley Augustus | *st e* | *W. Somerville* | Paige, 2 |
| Risegari, George Ludovic | *ce* | *Tufts College* | *146 Curtis St.* |
| Rutter, Josiah Baldwin | *st e* | *Waltham* | Δ Υ House |
| Sanborn, Roy Conway | *me* | *Dorchester* | Commons Club |
| Sanerib, Jacob | *ce* | *Jamaica Plain* | *41 Paul Gore St.* |
| Shea, Thomas Arthur | *ch e* | *Stoneham* | *54 Pine St.* |
| Shiels, Joseph Daniel | *ch e* | *Jamaica Plain* | *55 Dunster Rd.* |
| Silverman, Max | *ce* | *Dorchester* | *26 Lawrence Park* |
| Stafford, Roland Grover | *st e* | *Attleboro* | Α Τ Ω House |
| Stewart, Arthur David | *me* | *Hopkinton* | Commons Club |
| Tegan, Michael Joseph, Jr. | *ce* | *Charlestown* | *23 Green St.* |
| Terhune, Howard Haven | *st e* | *Dorchester* | Commons Club |

## Junior Class

| | | | |
|---|---|---|---|
| Abbott, Robert Leon | *ee* | *West Medford* | *108 Sharon St.* |
| Adams, John Harold | *ee* | *Passaic, N. J.* | Δ Υ House |
| d'Albergaria, José Soares | *ee* | *Azores Islands* | East, 12 |
| Archibald, Harry Cameron | *st e* | *Everett* | *163 Hancock St.* |
| Armington, Ralph Loud | *ee* | *Everett* | *15 Hampshire St.* |
| Ball, Lester Whiting | *me* | *Somerville* | *15 Melvin St.* |
| Boothby, Everett James | *ch e* | *Somerville* | *95 Pearl St.* |
| Brown, James Lawrence, Jr. | *ce* | *Somerville* | East, 7 |
| Comee, Edgar Randolph | *ce* | *Cliftondale* | Commons Club |
| Danver, Alan Thurston | *st e* | *Glenbrook, Conn.* | East, 15 |
| Dietch, Samuel Paul | | *Boston* | *272 Shawmut Ave.* |
| Eastman, Arthur Gilman | *me* | *Townsend* | Σ Τ Α House |
| Eldredge, Earle Bertram | *st e* | *So. Harwich* | Σ Τ Α House |
| Ellis, Frederick Joseph | *me* | *Somerville* | West, 2 |
| Fiske, Warren Munroe | *ee* | *Mexico City, Mex.* | Δ Τ Δ House |
| Fittz, Raymond Underwood | *ee* | *Natick* | East, 26 |
| Fox, Erving Nelson | *ee* | *W. Somerville* | *123 College Ave.* |
| Grupe, Howard Edwin | *me* | *New Canaan, Conn.* | Ζ Ψ House |
| Harrington, Ralph Dudley | *ee* | *Somerville* | *26 Oak St.* |
| Harrison, James William | *ch e* | *East Walpole* | Commons Club |
| Hinchcliffe, Paul George | *ch e* | *Stoneham* | *8 East St.* |
| Horn, Albert Mathias | *st e* | *Roslindale* | Δ Τ Δ House |
| Jameson, Charles Franklin | *ch e* | *W. Somerville* | *57 Lowden Ave.* |
| Maguire, James Bernard | *ch e* | *E. Boston* | *233 Saratoga St.* |
| Mendelsohn, Louis Edward | *me* | *Roxbury* | West, 27 |

| | | | |
|---|---|---|---|
| Merrithew, Francis Marion Blaisdell | *ee* | *Saugus* | Α Τ Ω House |
| Moore, Charles Edward | *ee* | *Peabody* | Ζ Ψ House |
| Moses, Eliot Brewster | *ee* | *Waltham* | *Worcester Lane* |
| Neale, John Arthur | *ce* | *Cliftondale* | *15 Felton St.* |
| Newton, Raymond Willis | *st e* | *Dorchester* | Δ Τ Δ House |
| Nicoll, George Wesley | *st e* | *Boston* | Σ Τ Α House |
| Palumbo, Emilio Leonard | *ce* | *Boston* | Paige, 3 |
| Pease, Maxfield | *me* | *Tufts College* | *205 College Ave.* |
| Rourke, Francis William | *ce* | *Concord, N. H.* | West, 2 |
| Schlotterbeck, William Charles | *ce* | *Roxbury Station, Conn.* | Δ Υ House |
| Scrannage, Lawrence Emery | *me* | *Medford* | *83 Dudley St.* |
| Shorrock, John William | *ce* | *Dorchester* | *39 Longfellow St.* |
| Snow, Herbert Endicott | *me* | *Brooklyn, N. Y.* | Commons Club |
| Stanger, Herbert Theophilus | *me* | *Roslindale* | Dean, 9 |
| Swan, Reuben | *ce* | *Dorchester Centre* | East, 15 |
| Teel, Lawrence Howes | *me* | *Salem* | West, 3 |
| Ulin, Benjamin | *ch e* | *Roxbury* | *37 Fort Ave.* |
| Wagner, Paul Barr | *ce* | *Brooklyn, N. Y.* | Δ Υ House |
| Walsh, Louis Joseph | *st e* | *Boston* | *19 Belvidere St.* |
| Webber, Lewis Gleason | *ee* | *Bedford* | Σ Τ Α House |

### Sophomore Class

| | | |
|---|---|---|
| Boss, John Harold | *Wellington* | *18 Fourth St.* |
| Coleman, Thomas Christopher, Jr. | *W. Somerville* | *29 Chandler St.* |
| Cross, Ralph Upton | *Worcester* | Δ Υ House |
| Dalton, George Alonzo | *Somerville* | West, 11 |
| Dempsey, Nelson William | *Stoneham* | West, 11 |
| Fairbank, John William | *Cambridge* | Α Τ Ω House |
| Garde, Leslie Eames | *Lynn* | *155 Shepard St.* |
| Hadley, Harold Elliot | *Cambridge* | Dean, 3 |
| Hall, Edward Franklin | *Lynn* | East, 18 |
| Halpin, Henry Edward | *Somerville* | *59 Albion St.* |
| Hamilton, Harold Sylvestor | *Cliftondale* | East, 24 |
| Holden, James Henry | *Roxbury* | East, 18 |
| Hunt, Everett Currie | *Somerville* | *40 Franklin St.* |
| Jameson, Robert | *Everett* | *19 Oakes St.* |
| Katz, Henry Leon | *Malden* | West, 18 |
| Keyes, William Arthur | *Lynn* | *177 Fayette St.* |
| Leary, John Joseph | *Newton* | *32 Channing St.* |
| Lee, Cedric Crandon | *Everett* | East, 23 |
| Locke, Edwin Augustus | *Belmont* | *25 Somerset St.* |
| Lutz, William Edmund Aloysius | *Somerville* | *102 Prospect St.* |
| Mota, Joas Ignacio Silveira da | *S. Paulo, Brazil* | West, 21 |

| | | |
|---|---|---|
| Nixon, Alexander Clifford, Jr. | *Brookline* | East, 21 |
| Pennucci, Conrad | *East Boston* | *115 Neptune Ave.* |
| Powers, Clinton Russell | *Portland, Me.* | West, 4 |
| Reed, Arthur Bryant | *Claremont, N. H.* | Δ Υ House |
| Reed, Everett Lenox | *Somerville* | *100 Jacques St.* |
| Stowell, Edson Bancroft | *Jamaica Plain* | East, 22 |
| Taylor, Raymond Clyde | *Arlington Heights* | East, 9 |
| Towne, Lester Newton | *Andover* | East, 9 |
| Upton, Charles Hastings | *Arlington Heights* | East, 24 |
| Wilson, Earl Snow | *Hyannis* | East, 19 |

## Freshman Class

| | | |
|---|---|---|
| Adelson, Louis | *Chelsea* | *14 Bloomingdale St.* |
| Anderson, Herbert Keith | *Milford, N. H.* | West, 21 |
| Ayers, Charles Frank | *Everett* | *101 Chestnut St.* |
| Babbitt, George King | *Tufts College* | West, 6 |
| Baldwin, Gilbert Edward | *Roxbury* | *245 Warren St.* |
| Bearse, Edwin Wilton | *Somerville* | *43 Cutter St.* |
| Berg, Carl | *Everett* | *34 Henry St.* |
| Bickford, Lawrence Wenzell | *Somerville* | *50 Vinal Ave.* |
| Borden, Karl Bigelow | *Collinsville, Conn.* | 159 Appleton St., Arlington Heights |
| Brown, Horton | *Marblehead* | West, 29 |
| Buckley, John Francis | *Arlington* | *28 Beacon St.* |
| Burbank, Colby Lewis | *Revere* | *101 Beach St.* |
| Carr, Philip Amory | *Lawrence* | *34 Dorchester St.* |
| Coddington, Philip Littlefield | *Tufts College* | Dean, 13 |
| Connor, Bernard Dominic | *Somerville* | *16 Hathorn St.* |
| Copp, John Irving | *Cambridge* | *23 Inman St.* |
| Davis, Chester Thomas Caverly | *Wolfeboro, N. H.* | East, 4 |
| Earle, Chester Reed | *Lawrence* | West, 15 |
| Esten, Edwin Chandler | *Littleton* | 15 Orchard St., Medford Hillside |
| Ferguson, David | *Methuen* | East, 5 |
| Flinn, James Miller | *Winchester* | *10 Dix St.* |
| Foster, Eliot Chandler | *Medford* | *10 Manning St.* |
| Friis, Jan Trap | *Medford* | *235 Main St.* |
| Gabrielson, Samuel | *Lawrence* | *108 Park St.* |
| Gough, John Harold | *Dorchester* | *47 Larchmont St.* |
| Green, Richard Winthrop | *Winthrop* | *90 Highland Ave.* |
| Heileman, Calvin Marx | *Tufts College* | *3 Capen St.* |
| Herald, Charles Raymond | *Everett* | *27 Dean St.* |
| Holmgren, Viking Raymond | *E. Lynn* | 184 Harvard St., Cambridge |

| | | |
|---|---|---|
| Hull, Edward Knevals | *Jamaica Plain* | *294 Chestnut Ave.* |
| Kaufman, Samuel | *Lynn* | *15 Morris St.* |
| Knowles, Mahlon Gilman | *Swampscott* | West, 14 |
| Leighton, Arthur Whiting | *Abington* | 26 Gibbens St., Somerville |
| Leland, Harold Bickford | *Somerville* | *34 Irving St.* |
| Lewis, Robert Sherman | *Washington, D. C.* | East, 2 |
| Little, Andrew Dodge | *Medford* | Α Τ Ω House |
| Macks, William Arthur | *Beverly* | Α Τ Ω House |
| McCarthy, John Joseph Jr, | *Somerville* | *220 Summer St.* |
| McCarthy, John Michael | *Natick* | East, 14 |
| McLellan, Robert Leston | *Dorchester* | *10 Oakley St.* |
| Merritt, Warren Franklin | *Galveston, Tex.* | East, 28 |
| Milliman, Frank Cooley | *Mattapan* | *7 Fottler Rd.* |
| Mishel, William Joseph | *Roxbury* | West, 10 |
| Morse, Arthur Lewis | *Watertown* | *14 Hersom St.* |
| Mortenson, Ernest Dawson | *Bedford* | 61 Glenwood Rd., Winter Hill |
| Nichols, Byron Franklin | *Methuen* | East, 5 |
| Peck, Howard Bennett | *Bridgewater, Conn.* | East, 16 |
| Perry, Emmanuel von Betzen | *Canal Zone, Panama* | 95 Sagamore Ave., Winthrop Highlands |
| Porter, Arthur Bray | *Salem* | East, 13 |
| Ransom, Lake Smith | *Longmont, Colo.* | 29 Sawyer Ave. |
| Reed, Alfred Smith | *Roslindale* | Dean, 14 |
| Segal, David | *Roxbury* | *46 Hampden St.* |
| Shepard, Eliot Blanchard | *Brookline* | Dean, 2 |
| Spaulding, Paul Pickering | *Dorchester* | *380 Washington St.* |
| Sweet, Walter Prescott | *W. Somerville* | *97 Orchard St.* |
| Terhune, Edward Andrus Jr. | *Dorchester* | East, 27 |
| Terry, Warren Franklin | *W. Somerville* | *108 College Ave.* |
| Turner, Robert Eaton | *Winthrop* | *14 Seymour St.* |
| Voss, William Charles | *Hartford, Conn.* | West, 10 |
| Waters, Mendal | *Roxbury* | *1036 Harrison Ave.* |
| Webb, Richard Bruce | *Washington, D. C.* | East, 23 |

## Unclassified Students

| | | |
|---|---|---|
| Atkins, Arthur Randolph | *Roslindale* | *14 Ardale St.* |
| Brett, Roy Cuming | *S. Braintree* | Paige, 22 |
| MacDonald, Norman Duncan | *Melrose* | *58 Howard St.* |
| Waite, Clayton Byron | *Fort Ann, N. Y.* | Paige, 22 |
| Wang, Ting Fen | *Tientsin, China* | West, 21 |

## Bromfield-Pearson School

| | | |
|---|---|---|
| Bingham, Leslie Frederic | *Cambridge* | *454 Green St.* |
| Bowen, Harold Vincent | *Providence, R. I.* | West, 4 |
| Clarke, William John | *Boston* | *11 Grenville Pl.* |
| Ela, Robert Blazo | *Cambridge* | *421 Green St.* |
| Gifford, Eliot Wing | *New Bedford* | West, 8 |
| Paul, Frederick Henry Jr. | *Waltham* | Δ Τ Δ House |
| Porter, Leo Augustus | *Stoughton* | East, 28 |
| Stanton, Charles Ingram | *Revere* | *170 Reservoir Ave.* |
| Tentler, Lewis Aaron | *Dorchester* | *1073 Dorchester Ave.* |
| Wahlen, Frank Gustave | *Montpelier, Vt.* | East, 32 |

## SUMMARY

| | |
|---|---|
| Senior | 46 |
| Junior | 45 |
| Sophomore | 31 |
| Freshman | 61 |
| Unclassified | 5 |
| Bromfield-Pearson School | 10 |
| Total | 198 |

# Graduates

☞*Alumni are requested to notify the Dean of the Engineering School of changes in address, to insure the correctness of this list*

### 1869

Frederic Howard White, Ph.B., C.E., r. 2 Appleton Ave., b. 365 Main St., Pawtucket, R. I., Dealer in Paints and Oils.

### 1870

*Arthur Madison Dodge, C.E., died in June, 1898.

*Warren Thompson, C.E., died at North Woburn, December 12, 1872.

### 1871

Thomas Stafford Davis, C.E., r. 16 Pearl St., Clinton, Mass., b. Treasurer of Clinton Hospital Association.

### 1873

George Locke Fernald, C.E., Alliance, Neb., Civil and Mining Engineer.

Frederick Gray, C.E., 4320 Central Ave., Indianapolis, Ind.

Charles Herbert Maxcy, C.E., 1106 Lords Court, New York, N. Y., Broker.

*Charles Albert Russell, C.E., A.B., 1872, died at Boulder, Colo., August 6, 1900.

### 1874

Clarence Rodolphus Gardner, C.E., M.D. (New York University), 1879, r. 87 Round Hill, b. 78 Main St., Northampton, Mass., Oculist and Aurist.

*James Fernald Senter, C.E., died at Malden, Mass., September 27, 1891.

### 1875

John Thomas Baker, C.E., 2616 Dupont Ave., South, Minneapolis, Minn., Civil and Hydraulic Engineer.

Albert Adriance Simpson, C.E., 120 Academy St., Poughkeepsie, N. Y., with Adriance, Platt & Co., Harvesting Machinery.

### 1876

Edwin Chapin Bailey, C.E., M.D. (University of Pennsylvania), 710 Flanders Bldg., Philadelphia, Pa., Physician.

Eugene Bucklin Bowen, C.E., Cheshire, Mass., Mercantile Business.

**JOHN BRISBON GILPATRICK**, C.E., Kendall Co., Plano, Ill., Contractor and Builder.

1877

*__GEORGE LYCURGUS PERRY__, C.E., died at Charlestown, Mass., March 15, 1885.

1878

*__JEWETT N. DARLING__, C.E., Ph.B., 1880, died at Colton, Calif., April 22, 1911.

**FRANK WEBSTER GILCREAST**, C.E., r. 53 No. Church St., Hazelton, Pa., b. Rm. 29, Navigation Bldg., Mauch Chunk, Pa., Chief Engineer, Lehigh and New England R. R.

**CHARLES BULLARD TOWERS**, C.E., Miles City, Mont., Investments.

**ADELBERT FINNEY WHITCOMB**, C.E., r. Hotel Assembly, Spokane, Wash., b. Great Northern Railway, Spokane, Wash., Engineer in charge.

1879

**AARON CROSBY DICKINSON**, C.E., r. 1007 Greenwood Ave., b. Box 53, Canon City, Colo., President, The Midvale Coal and Coke Co.

**LEVI ELMER FARNHAM**, C.E., r. 413 Chambers Ave., Camden, N. J., City Engineer.

**MATTHIAS LITTLE**, C.E., r. 7138 Olive St., b. City Hall, Kansas City, Mo., Draftsman in City Engineer's Office.

**FRANK MERRITT**, C.E., b. 1805 35th St., Galveston, Texas, b. G. C. & S. F. R. R., Chief Engineer.

**WILLIAM PETRIE**, C.E., D.V.M. (Ontario), 1889, 260 E. 28th St., Los Angeles, Cal., Veterinary Surgeon.

1880

**GEORGE WASHINGTON CHANDLER**, C.E.

**JAMES HERBERT PUTNAM**, C.E., r. 616 Walnut St., Hattisburg, Miss., b. City Engineer.

**OCTAVIO PACHECO SILVA**, C.E., 13 Riva Helvetia, Sao Paulo, Brazil Manufacturer.

1881

**GEORGE KING MILLIKEN**, C.E., 7141 Yale Ave., Chicago, Ill., Electrical Engineer, South Park System.

*__HENRY ADDISON NORTON__, C.E., died at Hightstown, N. J., in May, 1892.

**FREDERICK AVERY RICE**, C.E., Prineville, Oregon, County Surveyor of Crook County.

1883

**PHILIP CARDENAS**, C.E., Ocampo, Coahuila State, Mex., Civil Engineer,

**FRED STARK PEARSON**, C.E.., A.M.M., 1884, D.S., 1900, LL.D., 1905. 25 Broad St., New York, N. Y., Consulting Engineer.

**FRANK ELLWOOD SMITH**, C.E., r. 70 Chandler St., West Somerville, Mass., b. 39 Boylston St., Boston, Mass., Special Agent, Edison Electric Illuminating Co., Boston.

### 1884

**PHILIP GREEN WRIGHT**, A.M.B., A.M. (Harvard), 1887, 1443 East Knox St., Galesburg, Ill., Professor of Mathematics and Political Economy at Lombard College.

### 1885

**HUBERT FOOTE EDWARDS**, A.M.B., Ph.B., 1883, A.M., 1886, Bannack, Mont., Assayer and Mill Superintendent.

**EDWIN MASSENA LEE**, A.M.B., 7 Pleasant St., Gardner, Mass., Civil Engineer and Surveyor.

### 1886

**FRED PALMER CHAPMAN**, A.M.B., Franklin, Mass., President Franklin Yarn Co.

**WILLIAM PHELPS GANNETT, JR.**, A.M.B., r. 35 Rhode Island Ave., b. 55 Pine St., Providence, R. I., Treasurer Gannett Electrical Company.

***FRANK ELLIOTT PERRY**, A.M.B., died at Cincinnati, Ohio, January 30, 1904.

**MILTON GERRY STARRETT**, A.M.B., D.S., 1905, r. 223 E. 17th St., b. 100 Broadway, New York, N. Y., Consulting Engineer.

### 1887

**BRADFORD LAWTON AMES**, A.M.B., r. Copley Square Hotel, b. 205 Equitable Building, Boston, Mass., Treasurer Climax Smoke Preventer Co.

***CHARLES FENNO DOW**, A.M.B., died at Somerville, Mass., May 15, 1893.

**JAMES FRED GALLETLY**, A.M.B.

**HENRY WILDE HAYES**, A.M.B., C.E., 1897, r. 24 Gray St., Arlington, Mass., b. 8 Beacon St., Boston, Mass., State Engineer of Grade Crossings.

***FRANK OTIS MELCHER**, A.M.B., C.E., 1895, died February 21, 1912.

***EDWARD ROULSTON METCALF**, A.M.B., died at Philadelphia, October 9, 1911.

**WILLIAM JOHN SMITH**, A.M.B., r. 59 Norfolk St., b. 454 Massachusetts Ave., Cambridge, Mass., Proprietor.

**CARLETON FERGUSON SPINNEY**, A.M.B., York, Pa., President of Pennsylvania Foundry Co.

**CLEMENT VALDES**, A.M.B., 3-A Calle Ramos Arizpe No. 1, Saltillo, Coahuila, Mex., in Engineering Department of Mexican National Railway.

## 1888

HENRY SMITH DURKEE, A.M.B., r. 699 Belmont Ave., b. 17 Hampton St., Springfield, Mass., Civil Engineer.

ALFRED EVERETT HASKELL, A.M.B., r. 156 Strathmore Rd., Brighton, Mass., b. Public Works Department, City Hall, Boston, Mass., Assistant Engineer.

JOHN WINFIELD MOORE, A.M.B., Koutenay Falls Hotel, Slocan Junct., B.C.

*CLARENCE VICTOR PAGE, A.M.B., died July 9, 1903.

AMARO ARAUJO RIBEIRO, A.M.B.

WILLIAM HENRY FRAZER ROBERTSON, A.M.B.

HENRY EATON SHIPMAN, A.M.B., Brattleboro, Vt., Civil Engineer and Lumber Operator.

FRANK LESLIE TIBBETTS, A.M.B., r. 223 Morrison Ave., W. Somerville, Mass., b. Peerless Motor Car Co., 660 Beacon St., Boston, Mass., Designing Engineer.

## 1889

*WILLIAM CHURCHILL FELTON, A.M.B., died at Monson, Mass., June 20, 1891.

ARTHUR ADAMS FOLSOM, A.M.B., r. 87 Pinckney St., Boston, Mass., b. 19 Milk St., Boston, Mass., Lawyer.

JOHN STEVENS LAMSON, A.M.B., r. 10 Oakland Ave., Arlington Heights, b. Public Works Dept., 62 City Hall, Boston, Mass., Assistant Engineer.

ALVANO THOMAS NICKERSON, JR., A.M.B., r. 622 W. 135th St., b. 50 Pine St., New York, N. Y., Mechanical Engineer with W. S. Barstow Co.

FRANK NORMAN SIMONS, A.M.B., r. Goffstown, N. H., b. 987 Elm St., Manchester, N. H., Real Estate & Insurance.

## 1890

ALBERT DULEY BABSON. A.M.B., A.M.M., 1891, r. 10 Terrace Pl., Arlington, N. J., b. District Manager, Supply Dept., General Electric Company, 30 Church St., New York, N. Y.

WALTER LEONARD BEALS, A.M.B., r. 14 East Grove St., Middleboro, Mass., b. Treasurer of Middleboro Co-operative Bank, and Clerk, Middleboro Water Works.

ALFREDO DE ARAUJO BORGES, A.M.B., r. Pelotas Rio Grande do Sul, Brazil, Civil and Electrical Engineer.

FRANK THOMAS DANIELS, A.M.B., r. 6 Pearl St., Medford, Mass., b. 802 Grosvenor Bldg., Providence, R. I., Factory Mutual Fire Insurance Engineer.

HENRY ARTHUR HAMILTON, A.M.B., with Rio de Janeiro Tramway Light and Power Co., 76 Avenida Central, Rio de Janeiro, Brazil.

FREDERICK SHERMAN HICKOK, A.M.B., r. 3106 Berkeley Ave., Berwyn, Ill., b. 927 Marquette Building, Chicago, Ill., District Sales Manager of Ridgway Dynamo and Engine Co.

HORATIO WHITTEMORE MYRICK, A.M.B., 48 Hopkins Place, Longmeadow, Springfield, Mass., Electrician with Phelps Publishing Co.

*ALVA GARCELON PETTINGILL, A.M.B., died at Lewiston, Me., August 16, 1909.

ARTHUR WELLINGTON TOPPAN, A.M.B., r. 209 Highland Ave., Somerville, Mass., b. 9 Haverhill St., Boston, Mass., Manufacturer of Launches and Power Dories.

## 1891

CHARLES OSCAR BOURNE, A.M.B., r. 218 Howard St., Melrose, Mass., b. Master Electrician, Machinery Division, U. S. Navy Yard, Boston, Mass.

*ROBERT POND BROWN, A.M.B., died at Brooklyn, N. Y., Feb. 9, 1901.

CHARLES STAPLES DAVIS, A.M.B., r. 94 Pearl St., Somerville, Mass., b. 201 Devonshire St., Boston, Mass., District Manager, Westinghouse Lamp Co.

WARREN HERBERT FISKE, A.M.B., Apartado, 491, Barcelona, Spain.

*WILLIAM WALLACE FOSTER, A.M.B., died, Sept. 6, 1894.

*WILLIAM COURTNEY POTTLE, A.M.B., died at West Somerville, Mass. April 8, 1894.

JOSEPH WARREN PUTNAM, A.M.B., r. 66 Webster St., b. U. S. Electric Signal Co., W. Newton, Mass.

FRANK HENRY STEPHENSON, A.M.B., r. 521 West 186th St., New York City, b. 154 Nassau St., care of Public Service Commission. Draftsman.

FRED WARREN TEELE, A.M.B., M.S., 1904, P. O. Box 368, San Juan, P. R., General Manager, Porto Rico Railways Co., Ltd., Trinidad Electric Co., Ltd., Demerara Electric Co., Ltd., and Camagney Electric Co., Ltd.

BENJAMIN FRANKLIN THOMPSON, A.M.B., 15 Pine St., Winchester, Mass., Bookkeeper for American Hide and Leather Co., Boston, Mass.

## 1892

WOOSTER BLAKE CURTISS, A.M.B., r. 12 Stratford Road, Schenectady, N. Y., b. Appraisal Dept., General Electric Company, Engineer in Charge.

FRANCIS HATHAWAY DOANE, A.M.B., r. 841 Prescott Ave., b. 225 Jefferson Ave., Scranton, Pa., Principal of School of Electrical Engineering in International Correspondence School.

*HOWARD LINCOLN EDSON, A.M.B., died at Boston, Mass., Oct. 8, 1897.

WILLIAM SOUTHWICK GRAY, A.M.B., Ph.B., r. 938 So. St. Bernard St., b. 1030 Witherspoon Building, Philadelphia, Pa., Consulting Engineer.

JOSEPH HARDWICK, A.M.B., r. 209 Pequot Ave., b. 80 State St., New London, Conn., Electrical Engineer and Contractor.

JOHN MURRAY HOLLISTER, A.M.B., r. 9 Waverly Place, b. care of Power and Mining Dept., General Electric Co., Schenectady, N. Y.

*FREDERICK WILLIAM HOSFORD, A.M.B., died at Brooklyn, N. Y., January 20, 1894.

EDWARD JARVIS HUNT, A.M.B., r. Lewellyn Park, Orange, N. J., b. Prudential Bldg., Newark, N. J., Manufacturer of Electrical Specialties.

*ALFRED WARREN KENNEDY, A.M.B., C.E., died, 1910.

HENRY SUMNER SWAIN, A.M.B., r. 20 Waterberry Rd., Montclair, N. J., b. 426 West 58th St., New York, N. Y., Empire City Subway Co., Ltd., Engineer.

ALBERT OLIVER THAYER, A.M.B., r. Battle House, Mobile, Ala., b. Treasurer and General Manager of Magazine Hardwood Saw Mill Co.

LOUIS MELVIN WILSON, A.M.B., r. 7 Avon Road, b. Engineering Dept., General Electric Co., Schenectady, N. Y.

### 1893

GEORGE MOULTON BATES, B.E.E., r. 45 Pleasant St., Waltham, Mass., b. 201 Devonshire St., Boston, Mass., Manager, Boston office, Westinghouse Electric and Manufacturing Company.

HARRY GRAY CHASE, B.S., b. The White Co., Boston, Mass., Automobile Salesman.

CLINTON EMERSON DOLBEAR, B.E.E.

CHARLES RICE GOW, B.S., r. 25 Montview St., W. Roxbury, Mass., b. 166 Devonshire St., Boston, Mass., General Contractor.

*JOHN ALDEN NEAL, B.E.E., died at Pittsburgh, Pa., April 26, 1894.

*HENRY ALLEN PEAKS, B.C.E., died, November 5, 1910.

HARRY ORMAN ROBINSON, B.E.E., P. O. Box 1, Cuernavaca, Morelos, Mexico.

WILFRED WESLEY RUSS, B.E.E., Haverhill, Mass., Manager Shoe Factory.

STILLMAN SHAW, B.E.E., r. 23 Maple Terrace, Auburndale, Mass., b. 23 Central St., Boston, Mass.

*GEORGE EDWARD STRONG, B.C.E., died at Gloucester, Mass., January 12, 1895.

HOWARD HANCHETT WESTON, B.E.E., r. 42 Jacques St., Somerville, Mass., Milk Dealer.

### 1894

ROBERT CALTHROP BROWN, E.E., A.B., 1888, r. 65 Clarendon Ave., b. 19 Manning Arcade, Toronto, Ont., Can., Managing Director of Mexico Tramways Co., and The Mexican Light and Power Co., Ltd., Vice-Pres., Barcelona Traction, Light & Power Co., Ltd.

EDWARD PATRICK BYRNE, B.E.E., r. 137 Summer St., Medford, Mass., b. City Engineer of Medford.

CARL VOLTAIRE HATHAWAY, B.E.E., LL.B., r. Winthrop, Mass., b. Old South Building, Boston, Mass., Attorney-at Law and Consulting Engineer.

ISAAC BURRILL HERSEY, B.E.E., b. 457 Blue Hill Ave., Roxbury, Mass., Proprietor Grove Hall Hardware Company.

JOHN PURINGTON MALLETT, B.E.E., r. 184 Stiles St., Elizabeth, N. J. Electrical Engineer with Diehl Manufacturing Co.

JOHN OLIN MCDAVITT, B.E.E., r. 24 Carver St., Cambridge, Mass., b. 50 Oliver St., Boston, Mass., Supervisor Plant Accounting, N. E. Tel. & Tel. Co.

ADELBERT HARLAND MORRISON, B.E.E., E.E., 1895, r. 40 Salisbury Road, Brookline, Mass., b. Mechanic Arts High School, Boston, Mass., Head of Dept. of Science.

ROBERT HENRY MORSE, B.E.E.

FREDERICK HOWARD PEMBER, B.E.E., Providence, R. I., Master Mechanic, National and Providence Worsted Mills, American Woolen Company.

RUFUS CURTIS READ, B.E.E., Attleboro, Mass., Salesman for H. F. Barrows Co., Manufacturing Jewelers, N. Attleboro, Mass.

SAMUEL ALBERT SPALDING, B.E.E., r. 501 E. 13th St., Brooklyn, N. Y., b. Penn. R. R. Co., Pennsylvania Station, New York, N.Y., Asst. Engineer.

ALBERT STETSON, E.E., A.B., 1873, r. Sheepshead Bay, b. 170 Broadway, New York, N. Y., Patent Attorney.

ORVILLE JOPHANUS WHITNEY, B.C.E., r. 32 Franklin St., Medford, Mass., b. Supt. Water & Sewer Dept., City Hall, Medford.

ALBERT POTTER WILLS, B.E.E., Ph.D. (Clark), 1897, r. 25 Claremount Ave., b. Professor of Mathematical Physics in Columbia University, New York, N. Y.

EDWIN HANSCOM WRIGHT, B.E.E., r. 58 Centre St., Dorchester, Mass., b. 6 Hancock Ave., Boston, Mass., Architect.

## 1895

ARTHUR LINCOLN GEORGE, B.C.E., Johnstown, Pa., with Lorain Steel Company.

CHESLEY METCALF JOHNSTON, B.C.E., r. 5028 Chestnut St., b. 900 Arcade Bldg., Philadelphia, Pa., General Superintendent of Construction for Eyre, Shoemaker, Inc., Railroad Contractors.

CHARLES HARRISON PAGE, B.C.E., Box 922, Butte, Mont., Assistant Engineer in Anaconda Copper Mining Company.

## 1896

GEORGE ARTHUR BROTHERS, B.S., Manager Light and Power Department, Hudson, Mass.

JOHN NASH IVES, B.S., P. O. Box 276, W. Medway, Mass., b. 147 Milk St., Boston, Mass., with Stone & Webster Engineering Corporation, Electrical Engineer.

MELDON HUMPHREY MERRILL, B.S., r. 1322 Commonwealth Ave., Boston, b. 85 Devonshire St., Boston, Mass., Purchasing Agt., Mass. Consolidated Railways.

KONOSUKE OHATA, B.S., Yamagata, Yamagata-Ken, Japan, Yamagata Electric Co.

LESLIE LAWRENCE PERRY, B.S., r. Chester Depot, Vt.

GUY CLIFFORD PIERCE, B.S., r. 1810 Chicago Ave., Evanston, Ill., b. Western Advertising Manager, Associated Sunday Magazines, 309 Record-Herald Bldg., Chicaco, Ill.

EDWARD DANA SABINE, B.S., r. 619 So. Broadway, Yonkers, N. Y., b. New York, N. Y., Terminal Engineer, N. Y. C. & H. R. R. R. Grand Central Station.

WARNER DANIEL SMITH, B.S., r. 10 Magnolia St., Dorchester, Mass., b. 27 Scotia St., Boston, with Edison Electric Iluminating Co.

HERBERT WASHBURN SYMONDS, B.S., r. 40 Orne St., b. Eastern Bridge and Structural Co., Worcester, Mass., Checker.

ARTHUR THURSTON, B.S., r. 406 Laurel St., b. 46 Hanover St., Manchester, N. H., Manchester Traction, Light & Power Co., Electrical Engineer.

CHARLES EDWARD WHITON, B.S., care Chief Signal Officer, Philippine Dept., U. S. A., Manila, P. I., Asst. Elec. Engineer.

## 1897

HENRY CLARK BARDEN, B.S., r. Boston Ave., Tufts College, Mass.

CHARLES AUGUSTUS BROWNING, B.S., r. 463 North Grove St., E. Orange N. J., b. Sales Dept., Crocker-Wheeler Co., Ampere, N. J.

CHARLES BROOKS CLARK, B.S. (degree taken extra ordinem in 1908), LL.B. (Washington University), 1904, M.S., 1910, r. Hotel Jefferson, San Francisco, Cal., Captain (Infantry) Commissary, U. S. Army, Fort Mason, San Francisco, Cal.

WARREN STEWART CLARK, B.S., r. 69 Bedford Road, Schenectady, N.Y. General Electric Co., Designing Engineer.

JOHN STETSON EDMANDS, B.S., r. 15 Central St., Somerville, Mass., b. Harvard University Graduate School of Applied Science, Dept. of Landscape Architecture, Student.

ROBERT HALL FENTON, B.S., r. 225 Church St., Willimantic, Conn., b. The Windham Silk Co., Willimantic, Conn., Asst. Manager.

HERBERT IRVING GARCELON, B.S., r. 1101 E. 20th St., Baltimore, Md., b. Assistant Engineer of Tests, B. & O. R. R., Mt. Clare, Baltimore. Md.

CHARLES BROWN GRAVES, B.S., M.S., r. Marblehead, Mass., b. Manila Elec. Ry. & Lt. Co., Manila, P. I., Engineer.

ROLLA EDWIN HEALEY, B.S., r. 9 Brookline St., Needham, Mass., b. N. E. Tel. & Tel. Co., 119 Milk St., Boston, Mass., Toll Line Engineer.

FRANK FILES HICKS, B.S., r. 15 Cliff St., Yonkers, N. Y., b. New York, N. Y., Asst. Engineer, C. R. R. of N. J.

GEORGE WILLIAM HILL, B.S.. care of Westinghouse Lamp Co., Bloomfield, N. J.

WILSON TYLER HOWE, B.S., M. S., Philippine Civil Service, Bureau of Navigation, Manila, P. I.

HARRY ALFRED LANE, B.S., M.S., 1905, r. The Highland, Elgin Ave. and 11th St., Baltimore, Md., b. B. & O. R. R. Co., Baltimore, Md.

FRED MORSE RANDLETT, B.S.

GEORGE WALTER ROWBOTHAM, B.S. (degree taken extra ordinem in 1904), r. 12 Neron Pl., b. 720 Union St., New Orleans, La., Sec'y and Treas. Southern Belting Co.

HOWARD IRVING RUSSELL, B.S., r. 37 Harrison St., Manchester, N. H., b. Superintendent Amoskeag Mfg. Co.

ARTHUR ELLIS THAYER, B.S., r. 1185 Farmington Ave., West Hartford, Conn., b. 41 Summer St., Hartford, Conn., Chief Draftsman, with Pratt & Whitney Company.

## 1898

GEORGE EDWARD AHERN, B.S., 104 Medford St., Arlington, Mass., b. Town Hall, Town Engineer.

HERBERT WOODBURY ANDREWS, B.S., 70 Broad St., Pittsfield, Mass., b. Electrical Engineer, Transformer Eng. Dept., General Electric Co.

EDMUND MERRITT FRENCH, B.S., r, 147 Remsen St., Brooklyn, N. Y., b. 209 Montague St., Brooklyn, N. Y., Asst. Engineer, Dept. Public Works.

GEORGE ALEC HARWOOD, B.S., M.S., 1901, Sc.D., 1913, r. Autenreith Road and Oakwood Place, Scarsdale, N. Y., b. N. Y. C. & H. R. R. R. Co., Grand Central Terminal, New York, N. Y., Chief Engineer of Electric Zone Improvements.

GUY EDWARD JONES, B.S., r. 208 Holland St., W. Somerville, Mass., with University Press, Cambridge, Mass.

JOHN ARTHUR MADDOCKS, B.S., r. 3 Woodside Road, Winchester, Mass., b. 110 State St., Boston, Mass., Assistant District Sales Mgr., Gulf Refining Co.

ROBERT HAYWARD PARKE, B.S., M.S., 1903, r. 21 Abbot St., Greenfield, Mass., b. Division Engineer, B. & M. R. R., Greenfield, Mass.

WALTER ARTHUR PATTERSON, B.S., r. 27 Lloyd Road, Watertown, Mass., b. 439 Albany St., Boston.

LLEWELLYN ROOD PERKINS, B.S., A.B., 1902, A.M., 1912, r. South Woodstock, Vt., b. Middlebury College, Middlebury, Vt., Professor of Mathematics.

GEORGE NELSON ROBINSON, B.S., r. 1418 Corona St., Denver, Col., b. with General Electric Co., 617 First National Bank Bldg., Sales Agent.

FRANK ROBERT SCHOOLFIELD, B.S., r. 376 St. Johns Pl., Brooklyn, N. Y., b. 115 Broadway, New York, N. Y., Chief Draftsman with Ford, Bacon & Davis.

EDWIN ADAMS SHAW, B.S., r. 17 Kidder Ave., West Somerville, Mass., Principal High School, Natick, Mass.

**ANSON MERRILL TITUS**, B.S., r. 10 Raymond Ave., W. Somerville, Mass., b. with F. C. Alexander, Contractor, 745 Old South Bldg., Boston, Mass., Engineer and Estimator.

**FREDERICK EDWARD TOWN**, B.S., M.S., 1901, b. Otis Elevator Co., New York, N. Y.

**ROY TITUS WELLS**, B.S. and M.S., PH.D. (Clark), 1905, r. 181 Langley Road, Newton Center, Mass., b. with Holtzer, Cabot Electric Co., 613 Albany St., Boston, Mass.

## 1899

**CHARLES ROLLIN ALLEN, JR.**, B.S., r. 211 S. 2nd Ave., Mechanicsville, N. Y., b. Humane Bldg., Albany, N. Y., Engineer for New York State Highway Dept.

**LEWIS BARTLETT**, B.S., r. Fort Plain., N. Y., b. Assistant Engineer, Barge Canal, Albany, N. Y.

**CARL GORDON BRIGHTMAN**, B.S., r. 49 Stanton St., Dorchester, Mass., b. 84 State St., Boston, Mass.

**ARTHUR STACEY BUSS**, B.S., r. 217 Main St., Medford, Mass., b. Board of Water Supply, High Falls, Ulster County, N. Y., Asst. Engineer.

**ORVILLE COOPER**, B.S., r. 614 W. Creighton Ave., Fort Wayne, Ind., b. with Fort Wayne Electric Works, Fort Wayne, Ind., Supt. Switchboard Dept.

**MERVIN NATHANIEL DAVIS**, B.S., Berlin, N. H.

**ELBERT EUGENE GIBSON**, B.S., Grand Forks, B. C., Supt. Koutenay Water Power Co.

**FRED FAY GRISWOLD**, B.S., r. 14 S. 19th St., Orange, N. J., b. 219 Broadway, New York, N. Y., Board of Water Supply.

**HARRY EMERY HOLMES**, B.S., r. 73 Pierce Ave., Everett, Mass., b Engineering Dept., State Board of Health, Room 141, State House, Boston, Mass., Asst. Engineer.

**LESLIE ERASTUS HUNTER**, B.S., r. Essex Junction, Vt., b. with General Electric Co., Pittsfield. Mass.

**HARRY LIVINGSTON LITCHFIELD**, B.S., 38 Wallace St., W. Somerville, Mass., b. with Choralcelo Mfg. Co., 34 Farnsworth St., Boston, Mass.

**JOHN ISAAC MANGE**, B.S., r. 162 Sterling St., Watertown, O.

**ERNEST GILMAN MARBLE**, B.S., r. 52 E. Sedgwick St., Germantown, Pa. b. care of American Engineering Co., Cumberland St., and Aramingo Ave., Philadelphia, Pa., General Sales and Works Manager.

**WILLIAM BOULAY SMITH, Jr.**, B.S., 6 Dartmouth St., New Bedford, Mass.

**HARRIS CUSHMAN TROW**, B.S., r. 1428 E. 66th Pl., Chicago, Ill., b. Western Engraving Co., 610 Federal St., Chicago, Ill., Treasurer.

**JOHN EUGENE WALLACE**, B.S., r. 1006 Jefferson St., Wilmington, Del., b. 100 Broadway, New York City, Engineer-Manager.

1900

*STEPHEN EDWARD ABBOTT, B.S. (degree taken extra ordinem in 1901), died at Pottsdam, N. Y., Dec. 2, 1905.

JOSEPH BRADFORD BROOKS, B.S., r. 556 Oakwood St., Wilkinsburg, Pittsburgh, Pa., b. Standard Div., Engineering Dept., Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa., Engineer.

CHARLES ERNEST BURTON, B.S., r. 175 High St., b. 430 Congress St. Portland, Me., Civil Engineer.

HENRI FRANCIS CHADWICK, B.S., M.S., 1911, r. 500 Peebles St., Wilkinsburg, Pa., b. Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa., Sec. Standards Committee.

WILLIAM LEROY BERNARD CHRISTIAN, B.S., r. 35 Morningside Ave., b. Grand Central Sta., New York, N. Y.

LOUIS HENRY HAYNES, B.S. and M.S., b. Falkenau Electrical Construction Co., Stock Exchange Bldg., Chicago, Ill., Engineer.

GEORGE RUTHERFORD KEMPTON, B.S., b. So. Sierras Power Co., San Jacinto, Cal., Local Superintendent.

CHARLES DARROW KIRKPATRICK, B.S., b. 60 Federal St., Boston, Mass. Manager.

WILLIAM LORENZO LOCKE, B.S., White Bldg., Supt. of Construction for Stone & Webster Eng. Co., Seattle, Wash.

ERNEST MILLS LOVELL, B.S., r. Wayland, Mass., b. Instructor of Physics, Technical High School, Providence, R. I.

JOHN WILLIAM RABY, B.S., r. 125 S. Parkway, E. Orange, N. J., b. 15 Dey St., New York, N. Y., Division Supervisor of Equipment, American Tel. & Tel. Co.

CHARLES HENRY RESTALL, B.S., r. 43 Meridian St., Melrose, Mass., b. Boston & Maine Railroad, Boston, Mass., Assistant Engineer.

FRANCIS SOLOMON ROOT, B.S., r. 38 Oliver St., Fall River, Mass., b. Fall River Electric Light Co., Power Engineer.

ROBERT EDWARD WAGNER, B.S., 409 Rugby Road, Schenectady, N. Y., with General Electric Co., Asst. to Technical Superintendent.

1901

DEAN LEROY CHILSON, B.S., Franklin, Mass., General Contractor and Engineer, Treas. Franklin Construction Co.

LESTER WRIGHT COLLINS, B.S., The Demerara Electric Co., Ltd., Georgetown, British Guiana, Superintendent.

FRANK WILLIAM COUGHLIN, B.S., r. 55 Grove St., Lowell, Mass., b. Real Estate.

ROBERT EDWARD GOODELL, B.S., r. 7001 Perry Ave., Chicago, Ill., b. Cost Acct. Bureau of Economy & Efficiency, City Hall, Milwaukee, Wis.

DEXTER REYNOLDS HAWLEY, B.S., r. 12 Irving St., Waltham, Mass., b. 101 Milk St., Boston, Mass., Eng. Dept. of N. E. Tel. & Tel. Co.

**WILLIAM MACY JOY**, B.S., r. 215 West 23rd St., New York, N. Y., b. care of Electric Bond and Share Co., 71 Broadway, New York, N. Y., Assistant Engineer.

**EDWIN BUTLER ROLLINS**, B.S., r. 762 Main St., Westbrook, Me., b. Tufts College, Mass., Assistant Professor of Electrical Engineering in Tufts College.

**JOHN AUGUSTINE SEEDE**, B.S., r. 55 Bedford Road, Schenectady, N. Y., b. Consulting Engineer on Electric Furnaces, with General Elect. Co.

**GEORGE RAWSON SPOFFORD**, B.S., r. "The Haven Farm," Ashland, Mass., b. Chelmsford Foundry Co., Medford, Mass., Structural Draftsman.

**RALPH DANFORD THOMAS**, B.S., r. 414 7th Ave., S. E., Minneapolis, Minn., b. Minneapolis Mill Co. & St. Anthony Falls Water Power Co., 508 South 1st St., Principal Assistant Engineer.

**JAMES IRWIN TUCKER**, B.S., LL.B. (Boston Y. M. C. A. Evening Law School), r. Norman, Okla., b. University of Oklahoma, Director, School of Civil Engineering.

**CLARENCE DOANE WALKER**, B.S., r. 69 Grant St., Needham Mass., b. 578 Highland Ave., Needham Heights, Mass., owner of Electrical Contracting Business.

## 1902

**ROGER WELLINGTON ARMSTRONG**, B.S., A.B., 1901, r. 163 West 74th St., New York, N. Y., b. Board of Water Supply of New York City, 150th St., and St. Nicolas Place, New York, N. Y., Asst. Designing Engineer.

**WILLIAM WILLIS AUSTIN**, B.S., r. 67 No. Jackson St., Bellevue, Pa., b. C. D. and P. Tel. Co., 7th Ave. and Montour Way, Pittsburgh, Pa., Engineer, Supervisor of Cable Plant.

**WINTHROP TINGLEY ENDICOTT**, B.S., r. 17 Lafayette Ave., Chelsea, Mass., b. Electrical Engineering Dept., Boston Elevated Ry. Co., Boston, Mass., Assistant Electrical Engineer.

**HARRY BRIGHAM HUSSEY**, B.S., r. "The Leavenworth," James St., b. District Manager, Crocker-Wheeler Co., 609 O. C. S. Bank Bldg., Syracuse, N. Y.

**ALBERT EVERETT MANCHESTER**, B.S., r. 184 Potter Ave., Providence, R. I., b. Sec. A. C. Manchester Co., 136 Donance St., Providence, R. I.

**NATHANIEL CHILD MILLS**, B.S. in Civil and Electrical Engineering, r. Douglas, Mass., b. Canadian General Electric Co., Peterboro, Ont., Engineer.

**HERBERT MORLEY MORLEY**, B.S., M.S. (M. I. T.) 1904, r. 97 Talbot Ave., Tufts College, Mass., b. Edison Electric Ill. Co., 39 Boylston St., Boston, Mass., Engineer, Standardizing and Testing Dept.

**FREDERICK WILLIAM PATERSON**, B.S., r. Mill Valley, Marin County, Cal., b. General Electric Co., Rialto Bldg., San Francisco, Cal., Specialist.

**EMIL MONGER SCHNECK**, B.S., r. Box 448, Sherburne Falls, Mass.

HARRISON HERBERT SCHOOLFIELD, B.S., r. 1555 Knowles Ave., Portland, Ore., b. 1222 Spalding Bldg., Pacific Power & Light Co., Chief Draftsman.

FORREST ELLIOTT TARR, B.S., r. 1 Atlantic Ave., Beverly, Mass., b. 104 Milk St., Boston, Mass., Engineering Dept., N. E. Tel. & Tel. Co.

1903

ASHTON BERTON COOPER, B.S., r. 133 Albany Ave., Toronto, Ont., b. Transformer Sales Manager, Canadian General Electric Co., King and Sincoe St., Toronto.

SAMUEL THOMAS HALL, B.S., r. 26 Vinal Ave., b. English High School, Somerville, Mass., Teacher.

RALPH ELMORE KIMBALL, B.S., r. 19 Chestnut St., Jamestown, N. Y., b. care of Art Metal Construction Co., Jamestown, N. Y., Head of Standard Dept.

THOMAS SAWYER KNIGHT, B.S., r. Tufts College, Mass., b. General Electric Co., 84 State St., Boston, Mass., Supt. Switchboard Dept.

LEONARD LAURIAT, B.S., r. 191 Lowell St., Somerville, Mass., b. 39 Boylston St., Boston, Mass., with Edison Elec. Ill. Co.

OREN McKENNEY MOULTON, B.S., r. R. F. D. No. 1, Box 79, Gorham, Me., b. Ontario Power Co., Altmar, N. Y., Asst. Engineer on Hydro-Electric Power Development.

HARRY STANLEY PAGE, B.S., r. Mountain Ave., N. Woburn, Mass., b. 127 Furman St., Schenectady, N. Y., Electrical Engineer.

1904

ALFRED MOORE BOND, B.S., r. 103 Highland Ave., Winchester, Mass., b. Treasurer and Manager of Climax Paper Box Co., No. Cambridge, Mass.

WILLIAM VICTOR BURNELL, B.S., r. 8 Chestnut St., Mansfield, Mass., with Stone and Webster, Engineering Corporation, Houston, Tex., Supt. of Construction.

JAMES WHITON CHISM, B.S., r. 423 McClellan St., Schenectady, N. Y. b. Cost Clerk, Cost Dept., General Electric Co.

FREDERICK HOWARD DOHERTY, B.S., r. 138 S. Common St., b. Turbine Department, General Electric Co., Lynn, Mass.

ERNEST SPARRELL DRAPER, B.S., r. Wayland, Mass., b. Room 367, South Terminal Sta., Boston, Mass., Engineering Corps, B. & A. R. R.

PATRICK WILLIAM FLEMING, B.S., r. 71 Ithaca St., Elmhurst, L. I., New York, b. care of Gibbs & Hill, Consulting Engineers, Penna. Sta., New York City, N. Y., Engineer.

OSCAR EDMUND FORREST, B.S., r. 517 Brandywine Ave., b. General Electric Co., Schenectady, N. Y., Engineer. Wiring Supplies Engineering Dept.

ROBERT CLARE GAMMON, B.S. (degree taken extra ordinem in 1905), r. 824 Neal Ave., b. The Platt Iron Works Co., Daton, Ohio, Sales Engineer.

WILLIAM EVERETT HAZELTINE, B.S., r. 6306 Lakewood Ave., b. General Electric Co., Chicago, Ill., District Wire and Cable Specialist.

SHERBURNE HILL, B.S., r. 2 Grove St., b. Pacific Mills, Lawrence, Mass.

JAMES HENRY HOOD, B.S., r. 324 Common St., Watertown, Mass., b. Superintendent of Construction, Stone & Webster Engineering Corporation, 147 Milk St., Boston, Mass.

ALFRED BOARDMAN MAYHEW, B.S. (degree taken extra ordinem in 1905), r. Charlemont, Mass., b. Arrowrock, Idaho, First Asst. Engineer Construction of Arrowrock Dam.

MELVILLE SMITH MUNRO, B.S., r. 101 Talbot Ave., Tufts College, Mass., b. Assistant Professor of Electrical Engineering in Tufts College.

THEODORE WHITE NORCROSS, B.S., r. Takoma Park, Washington, D. C., b. Asst. Chief Engineer, U. S. Forest Service, Washington, D. C.

HENRY FARNSWORTH PERKINS, B.S., r. Forest Gate, Methuen, Mass., b. Pacific Mills, Worsted Dept. Lawrence, Mass., Mechanical Engineer.

ERNEST ALEXANDER SAUNDERS, B.S., r. 41 Beacon St., Gloucester, b. Oiled Clothing Mfg., 90 Rogers St., Gloucester, Mass.

*EDWARD HOLTON WOOD, B.S., died at Tufts College, Mass., April 28, 1908.

## 1905

JOSEPH D'AMARAL, B.S., r. Lagoa, Azores Islands, b. Empreza D'Electricidade E Gaz, S. Miguel, Azores.

WILLIAM WENDELL BEAN, B.S., 34 Canal St., W. Medford, Mass., Electrical Engineer.

HAROLD HEATH BODGE, B.S., r. 21 Ashland St., Arlington, Mass., b. 84 State St., General Electric Co., Boston, Mass.

COMPTON DURLIN BRAY, B.S., A.B., 1904, r. Tufts College, Mass., b. Mead, Morrison Mfg. Co., Cambridge, Mass.

ALFRED WHITMAN CHASE, B.S., r. 67 Concord Ave., Cambridge, Mass., b. 716 Board of Trade Building, Boston, Mass., Telephone Engineering.

LOUIS CHEVALIER, B.S., r. 22 Boyd Ave., Jersey City, b. 26 Exchange Place, Jersey City, N. J., Chief Engineer, Stillman-Delchanty-Ferris Co., Engineers & Contractors.

ERNEST DANA CROCKETT, B.S., r. 59 Oak Grove Ave., Springfield Mass., b. Prentiss Tool and Supply Co., 49 Federal St., Boston, Mass., Traveling Salesman.

WALDO EDGAR DODGE, B.S., r. 2230 College Ave., Berkeley, Calif., b. 607 Humbolt Bank Bldg., San Francisco, Calif., Structural Engineer.

FRANCIS ALEXANDER DODS, B.S., b. Box 2, Carson Sta., Pittsburgh, Pa., Electrical Inspector.

ROY GAY DOW, B.S., r. 421 Orchard Place, Mt. Oliver Station, Pittsburgh, Pa., b. Western Electric Co., Pittsburgh, Pa., Telephone Engineer.

WALTER WARREN EWELL, B.S., 33 Capen St., Medford, Mass., City Engineer.

EDWARD LESLIE FARRAR, B.S., r. 94 Bradford Ave., Crafton, Pa., b. General Electric Co., Oliver Bldg., Pittsburgh, Pa., Sales-Agent.

HERMAN FLAGG FORD, B.S., r. 173 Mott Ave., Long Island City, N. Y., b. 142 East Ave., L. I. City, N. Y., Inspector, P., N. Y. & L. I. R. R. Co., East River Tunnel Contract.

HAROLD LORING GORDON, B.S., r. 1939 E. 31st St., b. B. & O. R. R. Co., Central Bldg., Baltimore, Md., Assistant Engineer.

CHARLES ERNEST HARRINGTON, B.S., b. Concrete Steel Engineering Co., 822 Park Row Bldg., New York, N. Y., Engineer.

HERBERT CARR KNIGHT, B.S., r. 33 Mall St., b. General Electric Co., Lynn, Mass., Electrical Engineer.

GEORGE ALBERT LOWE, JR., B.S., r. 81 Wilson Ave., b. Canadian Fire Underwriters' Association, 29 Wellington St., East, Toronto, Ont., Can., Inspector.

JOHN GEORGE MILNER, B.S., r. Union St., North Marshfield, Mass., b. Farmer.

LUTHER PACKARD PERRY, B.S., r. 78 Miller Ave., b. Narragansett Electric Lighting Co., Providence, R. I., Power Engineer.

FRANCIS JOSEPH SEERY, B.S., r. 504 University Ave., b. College of Civil Engineering, Cornell University, Ithaca, N. Y., Assistant Professor of Civil Engineering.

GEORGE MORRIS TOMPSON, JR., B.S., r. Parker Road, Wakefield, Mass., b. Boston, Revere Beach & Lynn R. R., Consulting Engineer.

*BLYNN FRED VILES, B.S.

HUGH HORACE WELLMAN, B.S. (degree taken extra ordinem in 1906), r. Lexington, Mass., b. Room 1104, 79 Milk St., Boston, Mass., Estimating Engineer, with General Fire Extinguisher Co.

WENDELL LOUIS WHITEHOUSE, B.S., Coe-Mortimer Co., Moosic, Pa., Chief Chemist.

HOWARD ROGERS WHITNEY, B.S., r. 109 Bartlett St., Somerville, Mass., b. Van Buren, Ark., Assistant Division Engineer, Missouri Pacific R. R. Co.

HARRY PERCIVAL WILSON, B.S., r. 40 Hazelton Ave., b. 98 Bay St., Toronto, Can., Norcross Bros. Co., Ltd., Canadian Manager.

FRANK COY WOODWARD, B.S., r. E. Pepperell, Mass., b. with Cooper, Snell Co., Little Falls, N. Y.

### 1906

HARVEY LIBBY AMES, B.S., r. 178 Spruce St., b. Watertown Arsenal, Watertown, Mass., Mechanical Draftsman.

SETH HOWARD BOARDMAN, B.S., r. 87 Glendale Rd., Georgetown, Mass.

Freeman Shedd Crowell, B.S., r. Curtis Ave., Box 78, Dalton, Mass., b. General Electric Co., Pittsfield, Mass., Cost and Statistica Engineer.

Leon George Cutler, B.S., r. 127 S. Parkway, E. Orange, N. J., b. 43 Exchange Place, New York, N.Y., Asst. Engineer with J. G. White & Co.

Leon Edward Dix, B.S., r. Northfield, Vt., b. Norwich University, Northfield, Vt., Asst. Professor of Civil Engineering.

Henry Haile Dole, B.S., r. Alstead, N. H., b. Farmer.

Maurice Nathaniel Dustin, B.S., r. 228 Main St., Waterville, Me., b. Jacksonville, Fla., Structural Engineering,

Herbert Cram Ellis, B.S., r. 61 Forest Ave., E., Detroit, Mich., b. Inspector, New York City Board of Water Supply, White Plains Club, White Plains, N. Y.

William Ernest Fisher, B.S., r. 1159 Fanquire St., b. Griffin Coal Co., St. Paul, Minn., Assistant Charging Room Foreman.

Ralph Justin Fogg, B.S., Lehigh University, South Bethlehem, Pa., Asst. Professor of Civil Engineering.

Otho McCarroll Graves, B.S., r. 640 Lafayette St., Easton, Pa., b. Lafayette College, Assistant Professor of Graphics.

Benjamin Joseph Gudge, B.S., r. 852 Rebecca St., Wilkinsburg, Pa., b. Westinghouse Elec. & Mfg. Co., Pittsburgh, Pa., Electrical Engineer.

Norris Edmund Hadley, B.S., r. 35 Conwell Ave., W. Somerville, Mass., b. Boston Bridge Works, Boston, Mass., Structural Draftsman.

Chester Adams Hayes, Jr., B.S., r. North Berwick, Me., b. Electrical Contractor.

Edwin Ernest Hickey, B.S., r. Onset, Mass., b. Dealer and Expert in Gas and Gasoline Engines.

Henry Baxter Inglis, B.S., r. 21 Charlotte Ave., b. Detroit, Mich., Electrical Engineer.

John Paul Jones, B.S., r. 312 Glenwood Boulevard, Schenectady, N. Y., b. Supply Dept., General Electric Co.

Norval Edmund Lamb, B.S., r. 121 North Fitzhugh St., Rochester, N. Y., b. New York Telephone Co., Wisner Bldg., Rochester, N. Y., District Engineer.

Harry Nelson Lendall, B.S., r. 51 Bayard St., New Brunswick, N. J., b. Rutgers College, Instructor in Civil Engineering.

Carle Jewett Merrill, B.S., r. 75 Pearson Rd., W. Somerville, Mass., b. B. F. Sturtevant Co., 34 Oliver St., Boston, Mass., Sales Engineer.

Arthur Smith Page, B.S., r. 536 White St., b. Division Office, N. E. T. & T. Co., Springfield, Mass., Head Installer, Office of Div. Foreman of Equipment.

Leslie Blaine Phillips, B.S., r. 1088 Broadway, W. Somerville, Mass., b. Worcester Mechanics Savings Bank, Worcester, Mass.

**FRED WILLIS PROCTOR**, B.S., r. 5 Berkshire Court, Hoosac St., b. City Hall, No. Adams, Mass., Supt. of Streets.

**ALFRED FELTON SMEAD**, B.S., b. Deering High School, Portland Me., Instructor in Manual Training.

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**CHESTER EMERSON TAYLOR**, B.S., r. 286 Chestnut St., Clinton, Mass., b. Boston & Albany R. R., Palmer. Mass., Supervisor of Track.

### 1907

**FRANCISCO BENTO DE ALVARENGA**, B.S., r. Alameda Barao do Rio Branco, 54, Sao Paulo, Brazil, b. Siemens-Schuckertwerke Co., Rio de Janeiro, Brazil.

**JOHN ALEXANDER BACKUS**, B.S., Putnam, Conn., Principal of High School.

**THEODORE SHELDRAKE BACON**, B.S., r. 19 Eagle St., b. General Electric Co., Schenectady, N. Y., Lighting Dept.

**ARMAND WILLIAM BENOIT**, B.S., r. 34 Salem St., Lawrence, Mass., b. care of C. T. Main, 201 Devonshire St., Boston, Mass., Civil Engineer.

**PERLEY J. BUCHANAN**, B.S., r. Barre, Vt., b. Montgomery, Ala., Chemist.

**CHARLES HENRY CLARE**, B.S., r. Reservoir Court, Beacon St., Brookline, Mass., b. 89 State St., Boston, Mass., Sales Engineer.

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**LEO OTIS COLBERT**, B.S., r. 28 Cordis St., Charlestown, Mass., b. U. S. Coast and Geodetic Survey, Manila, P. I., Assistant.

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**HAROLD WOODARD DERRY**, B.S., r. 208 High St., N. Attleboro, Mass., b. Pittsfield, Electric Co., Pittsfield, Mass., New Business Manager.

**CORNELIUS FRANCIS DUFFEY**, B.S., b. B. F. Sturtevant Co., Hyde Park, Mass., Electrical Engineer.

**CHARLES THEODORE DWELLEY**, B.S., Lane, Ida., Homesteader.

**LESTER SYLVANUS FLINT**, B.S., b. High School, Belmont, Mass., Teacher.

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FREDERICK WILLIAM LEWIS, B.S., Bethlehem, N. H.

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JOHN FREEMAN SANBORN, B.S., Newfields, N. H.

GORDAN GRANT SHEAFER, B.S. (degree taken extra ordinem in 1908).

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### 1908

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CARLTON NUDD CONNER, B.S., r. 35 Astor Place, b. care of Marcus Higginbotham, Jersey City, N. J., Designer and Checker of Reinforced Concrete Bridges and Buildings.

Alfred Sherman Davis, B.S., r. 456 W. Main St., Norwich, Conn., b. Connecticut Co., New Haven, Conn., Asst. Engineer.

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JOSEPH WILLIAM ZELLER, B.S., r. W. Newton, Mass., b. Duval High School, Jacksonville, Fla., Director of Mechanic Arts and Drawing.

## 1909

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RALPH EDWARD CASE, B.S.

HOWARD EVERETT COUSINS, B.S., r. 56 Dartmouth St., Belmont, Mass., b. Lockwood, Greene and Co., First National Bank Bldg., Boston, Mass., Civil Engineer.

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ROBERT LEE WOOD, B.S., r. Oxnard, Cal., b. California Eucalyptus Lumber Co., Vice-Pres. and Supt.

## 1910

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RICHARD CONGDON ALLEN, B.S., r. 30 Woodward Ave., Quincy, Mass., b. Westinghouse Elec. & Mfg. Co., 201 Devonshire St., Boston, Mass., Salesman.

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OSCAR CLEMENS BOHLIN, B.S., r. 10 Sycamore St., Worcester, Mass., b. H. J. Heinz Co., Boston, Mass., Salesman.

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CHESTER INGALLS CONN, B.S., r. 13 Plimpton St., Woburn, Mass., b. care of Stone and Webster, Fresno, Cal., Cost Clerk.

LESLIE FORREST CURTIS, B.S., r. Assinippi, Mass., b. University of Washington, Seattle, Washington, Instructor in Electrical Engineering.

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GILBERT EVERETT ELLIS, JR., r. 10 McKinley Ave., W. Orange, N. J., b. Edison Storage Battery Co., Orange, N. J., Asst. to Chief Electrical Engineer.

ROYS ARTHUR ELLIS, B.S., r. 173 Westminster St., Detroit, Mich., b. Detroit Central High School, Instructor in Mathematics.

ROY WILLIAM THOMPSON FRANCIS, B.S., r. 5 Neilson Ave., Everett, Mass., with General Elec. Co., Lynn, Mass.

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SAMUEL JAMES HEAP, B.S., r. 274 Boston Ave., Tufts College, Mass., b. Aberthaw Construction Co., 8 Beacon St., Boston, Mass., Draftsman.

HENRY CLINTON HOUSTON, B.S., r. Methuen, Mass., b. Caribbean Construction Co.

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Robert Edes Kimball, B.S., b. Second Lieutenant, Coast Artillery Corps, U. S. A., Fort Hancock, N. J.

Gilberto Lasnier, B.S., Andes 276, Montevideo, Uraguay.

John Henry Leavitt, B.S., r. 192 Division St., Schenectady, N. Y., b. Wire and Cable Sales Dept., General Electric Co., Schenectady, N. Y. Asst. to Manager of Wire and Cable Sales Dept.

John Bruce Mailey, B.S., r. 20 Howard St., Lynn, Mass., b. Boston & Maine R. R., North Station, Boston, Mass., Draftsman, Dept. of Bridges.

Paul McClintock, B.S., r. 27 Crescent Ave., Chelsea, Mass., b. Bay State St. Ry. Co., 84 State St., Boston, Mass.

Walter Rufus McLeod, B.S., r. 7 Batavia St., Boston, Mass. b. 3 Guilderland Ave., Schenectady, N. Y., General Electric Co., Testing Dept.

George Edward Merchant, Jr., B.S., r. 31 Eastern Ave., Gloucester, Mass.

*William Morrison, Jr., B.S., died in San Francisco, Calif., Sept., 1910,

William Harrison Morrison, Jr., r. 8 Auburn St., Nashua, N. H. b. Union Sta., M. of W. Dept., N. Y. C. & H. R. R. R. Co., Albany, N. Y.

John Jeremiah Murrill, B.S., 538 Market St., Rockland, Mass., b. Salto de Comeris, Bayama, P. R. Asst. Engineer Hydroelectric Plant.

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Ephraim Ericson Sanders, B.S., r. Portland, Me., b. Sanders Contracting Co., Inc., 102 Exchange St., Portland, Me., President.

Sidney Leroy Savage, B.S., r. 25 Rogers Ave., West Somerville, Mass. Electrical Engineer.

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Irving Hart Tolles, B.S., r. Terryville, Conn., b. 22 Johnson St., Waterbury, Conn., Waterbury Farrel Foundry and Machine Co., Waterbury Conn., Draftsman.

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*HENRY CASS WHIPPEN, B.S., A.B., died at Kingston, N. H., Feb. 11, 1912.

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SAMUEL ZION, B.S., r. 15 Normandy St., Roxbury, Mass., b. care of Henry Goldmark, Designing Engineer, Culebra, Isthmus Canal Zone, Draftsman.

1911

CLIFFORD NEAL AMSDEN, B.S., r. 368 Fourth St., South Boston, Mass., b. N. Y. N. H. & H. R., Room 469, South Station, Boston, Mass., Rodman, Old Colony District.

FRANK WILLIAM ANDERSON, B.S., b. Holtzer-Cabot Co., Brookline, Mass.

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FRANK MELOON COLDRICK, B.S. M.E.E. (Harvard) 1913, r. 81 Quincy St., Tufts College, Mass., b. Densmore & LeClear, 88 Broad St., Boston, Room 710, Draftsman.

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**JOSEPH FREDERICK THIELE MANN**, B.S., r. 58 Emerson Road, Winthrop Center, Mass., b. 514 Todd St., Wilkinsburg, Penn., Sales Dept., Westinghouse Elec. & Mfg. Co.

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